

This Page Is Inserted by IFW Operations
and is not a part of the Official Record

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

IMAGES ARE BEST AVAILABLE COPY.

**As rescanning documents *will not* correct images,
please do not report the images to the
Image Problem Mailbox.**

FIG. 1A

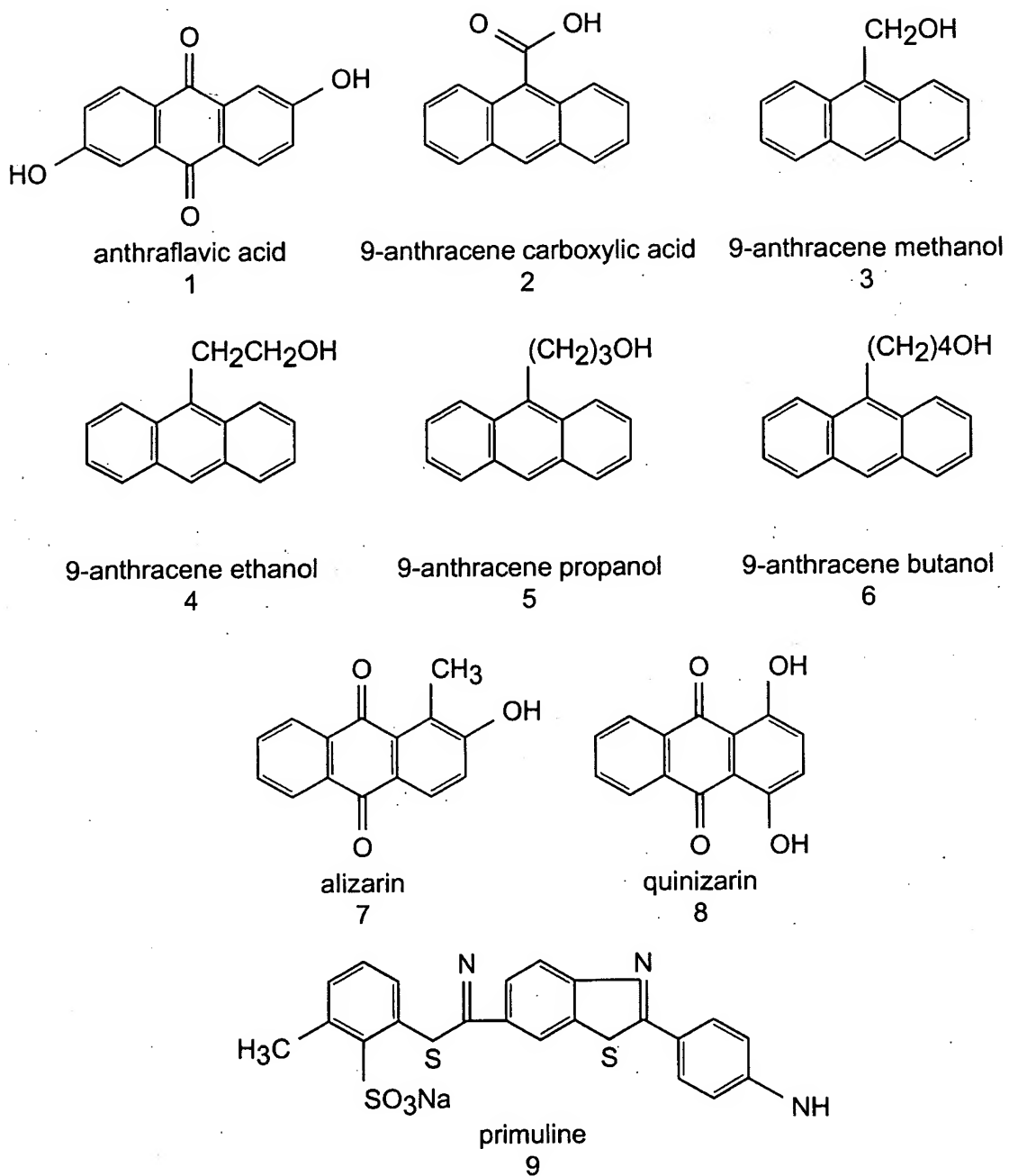


FIG. 1F

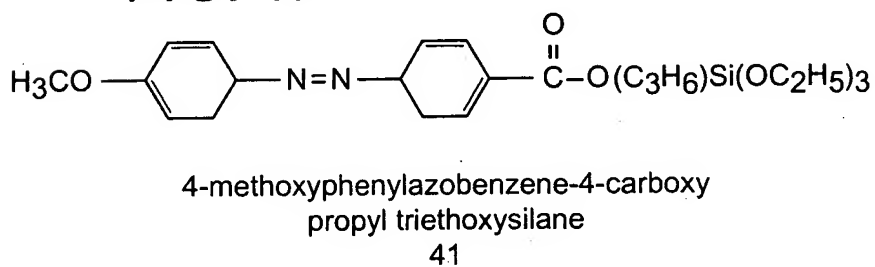
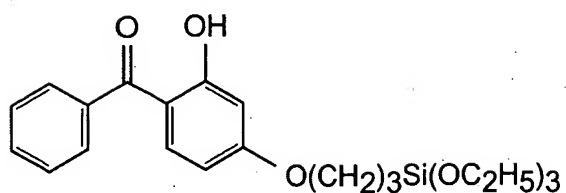
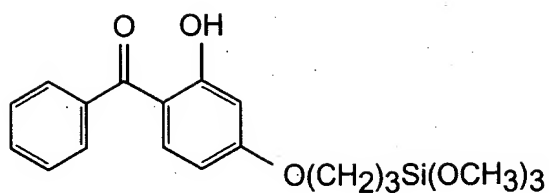


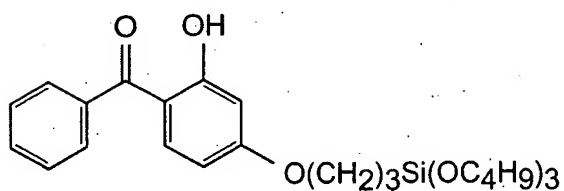
FIG. 1B



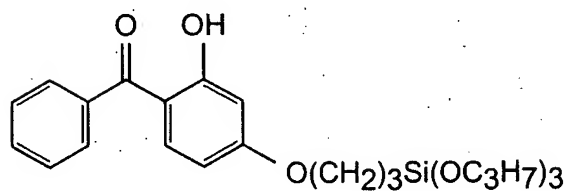
2-hydroxy-4-(3-triethoxysilylpropoxy)-
diphenylketone
10



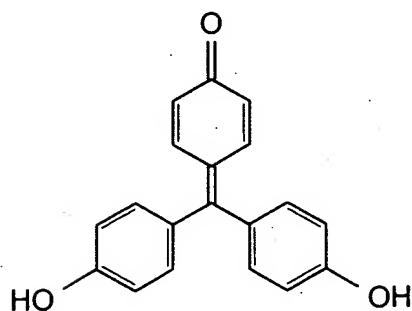
2-hydroxy-4-(3-trimethoxysilylpropoxy)-
diphenylketone
11



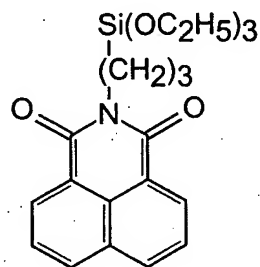
2-hydroxy-4-(3-tributoxysilylpropoxy)-
diphenylketone
12



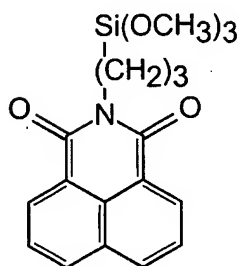
2-hydroxy-4-(3-tripropoxysilylpropoxy)-
diphenylketone
13



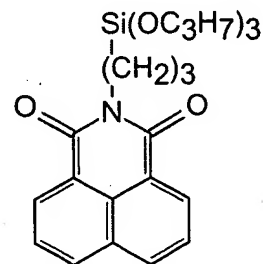
rosolic acid
14



triethoxysilylpropyl-1,8-naphthalimide
15

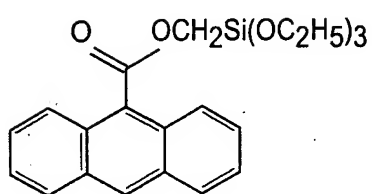


trimethoxysilylpropyl-1,8-naphthalimide
16

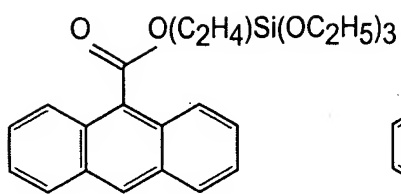


tripropoxysilylpropyl-1,8-naphthalimide
17

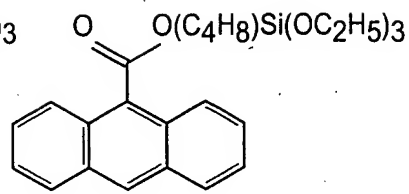
FIG. 1C



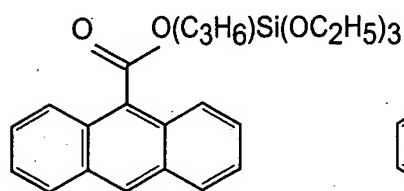
9-anthracene carboxy-methyl
triethoxysilane (TESAC)
18



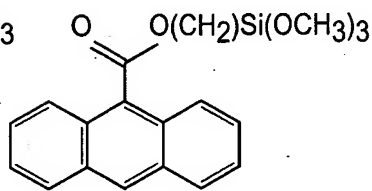
9-anthracene carboxy-ethyl
triethoxysilane
19



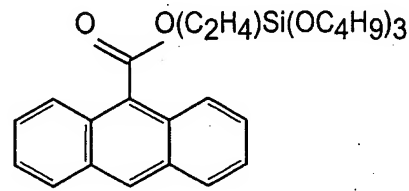
9-anthracene carboxy-butyl
triethoxysilane
20



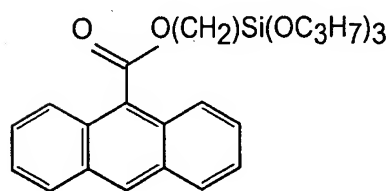
9-anthracene carboxy-propyl
triethoxysilane (TESAC)
21



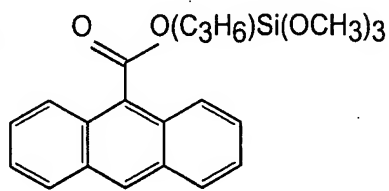
9-anthracene carboxy-methyl
trimethoxysilane
22



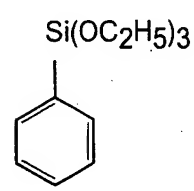
9-anthracene carboxy-ethyl
tributoxysilane
23



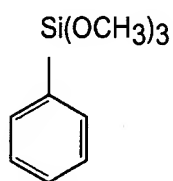
9-anthracene carboxy-methyl
tripropoxysilane
24



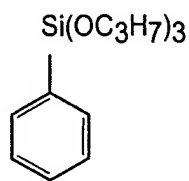
9-anthracene carboxy-methyl
trimethoxysilane
25



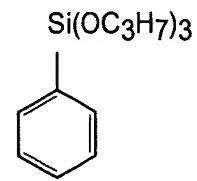
phenyltriethoxysilane
26



phenyltrimethoxysilane
27

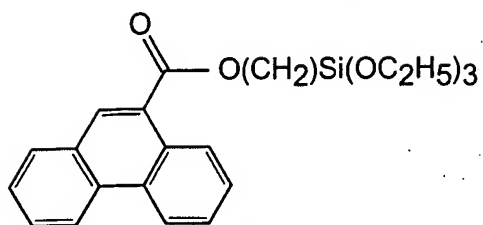


phenyltripropoxysilane
28

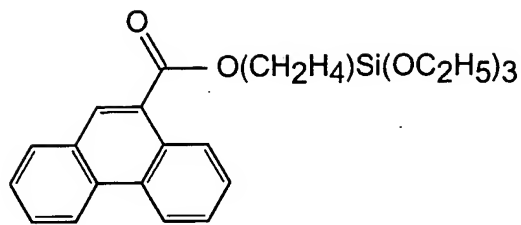


phenyltriethoxysilane
29

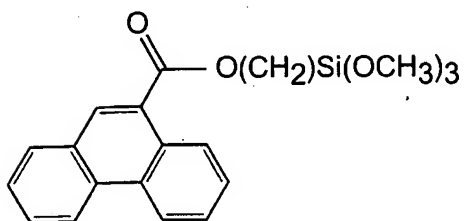
FIG. 1D



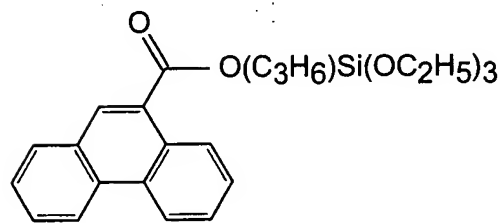
10-phenanthrene carboxy-methyl
triethoxysilane
29



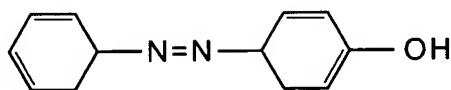
10-phenanthrene carboxy-ethyl
triethoxysilane
30



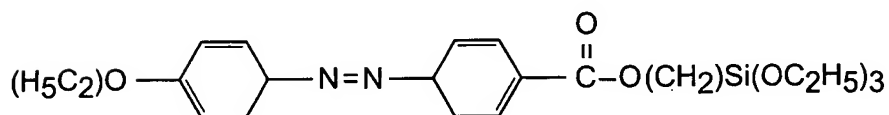
10-phenanthrene carboxy-methyl
trimethoxysilane
31



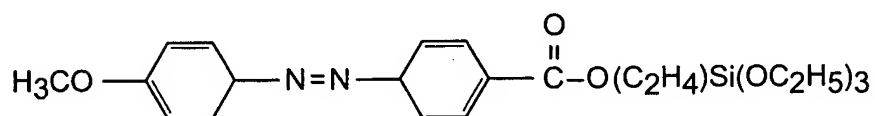
10-phenanthrene carboxy-propyl
triethoxysilane
32



4-phenylazophenol
33

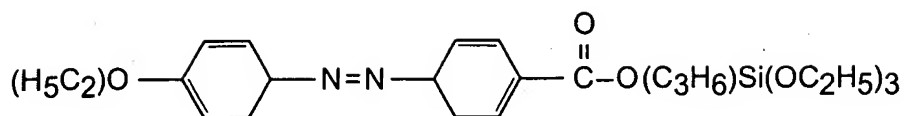


4-ethoxyphenylazobenzene-4-carboxy
methyl triethoxysilane
34

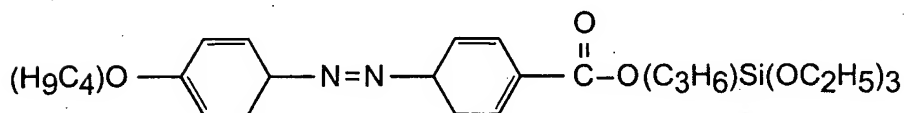


4-methoxyphenylazobenzene-4-carboxy
ethyl triethoxysilane
35

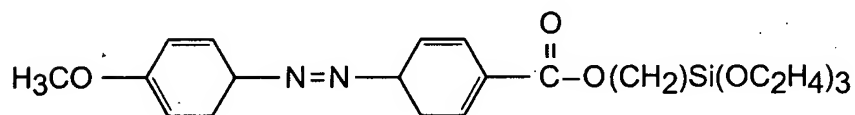
FIG. 1E



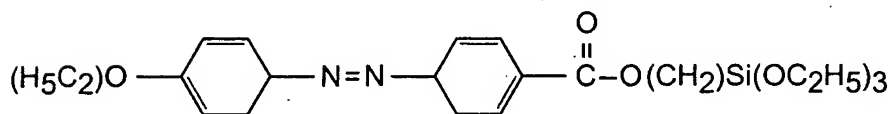
4-ethoxyphenylazobenzene-4-carboxy
propyl triethoxysilane
36



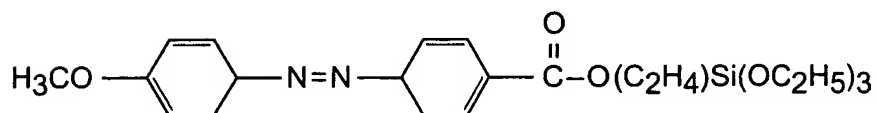
4butoxyphenylazobenzene-4-carboxy
propyl triethoxysilane
37



4-methoxyphenylazobenzene-4-carboxy
methyl triethoxysilane
38



4-ethoxyphenylazobenzene-4-carboxy
methyl triethoxysilane
39



4-methoxyphenylazobenzene-4-carboxy
ethyl triethoxysilane
40

TGA

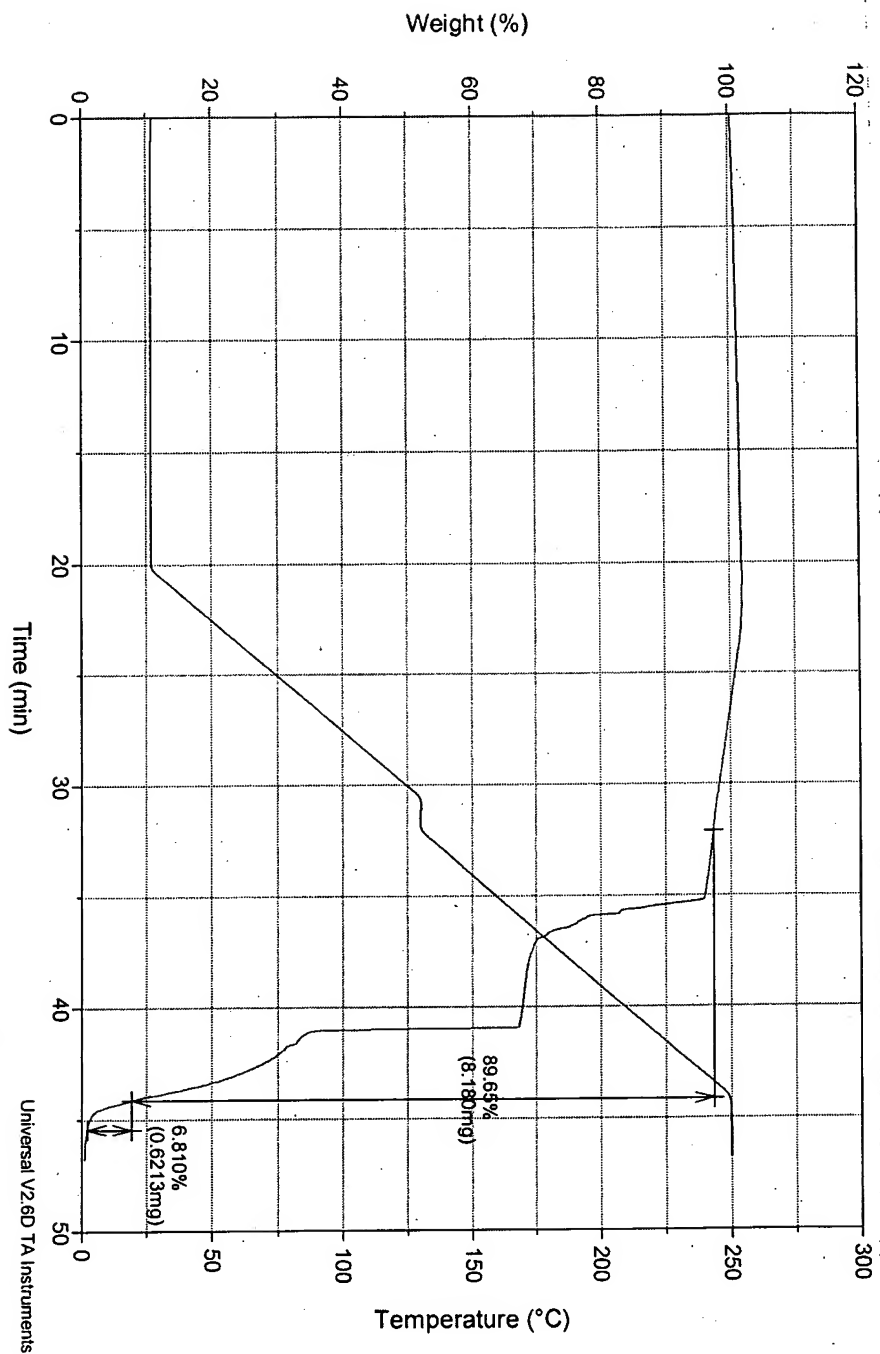


Figure 2

Universal V2.6D TA Instruments

TGA

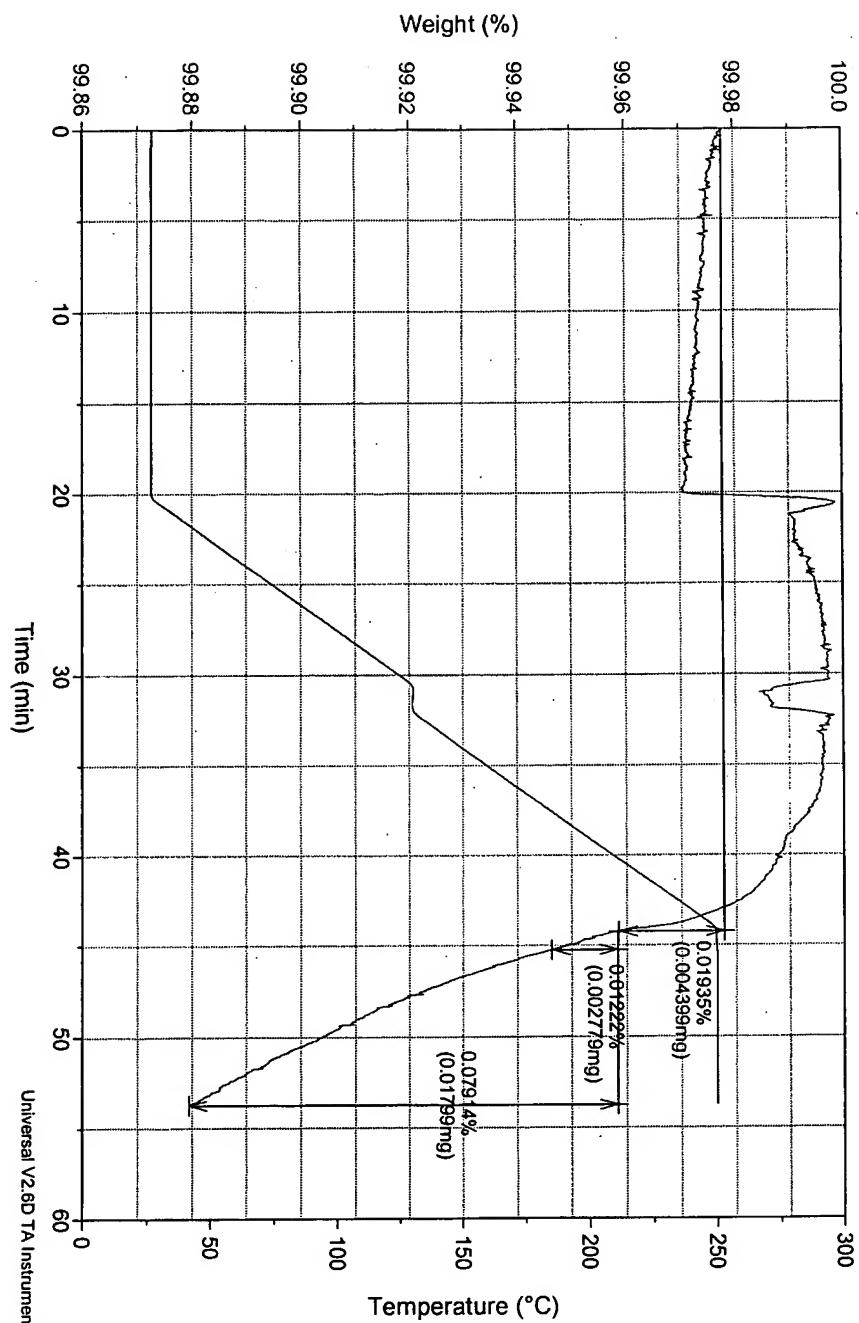


Figure 3

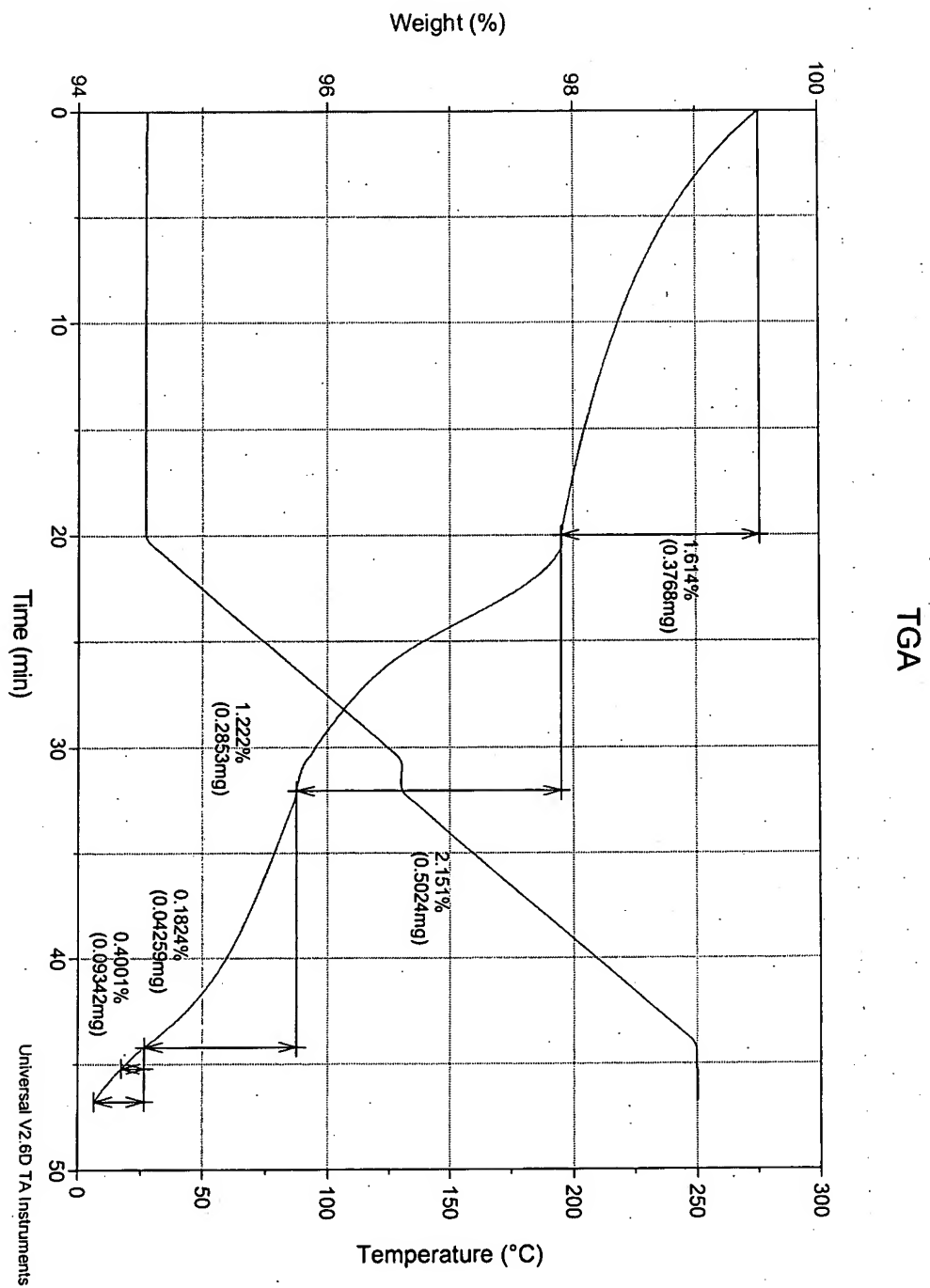


Figure 4

TGA

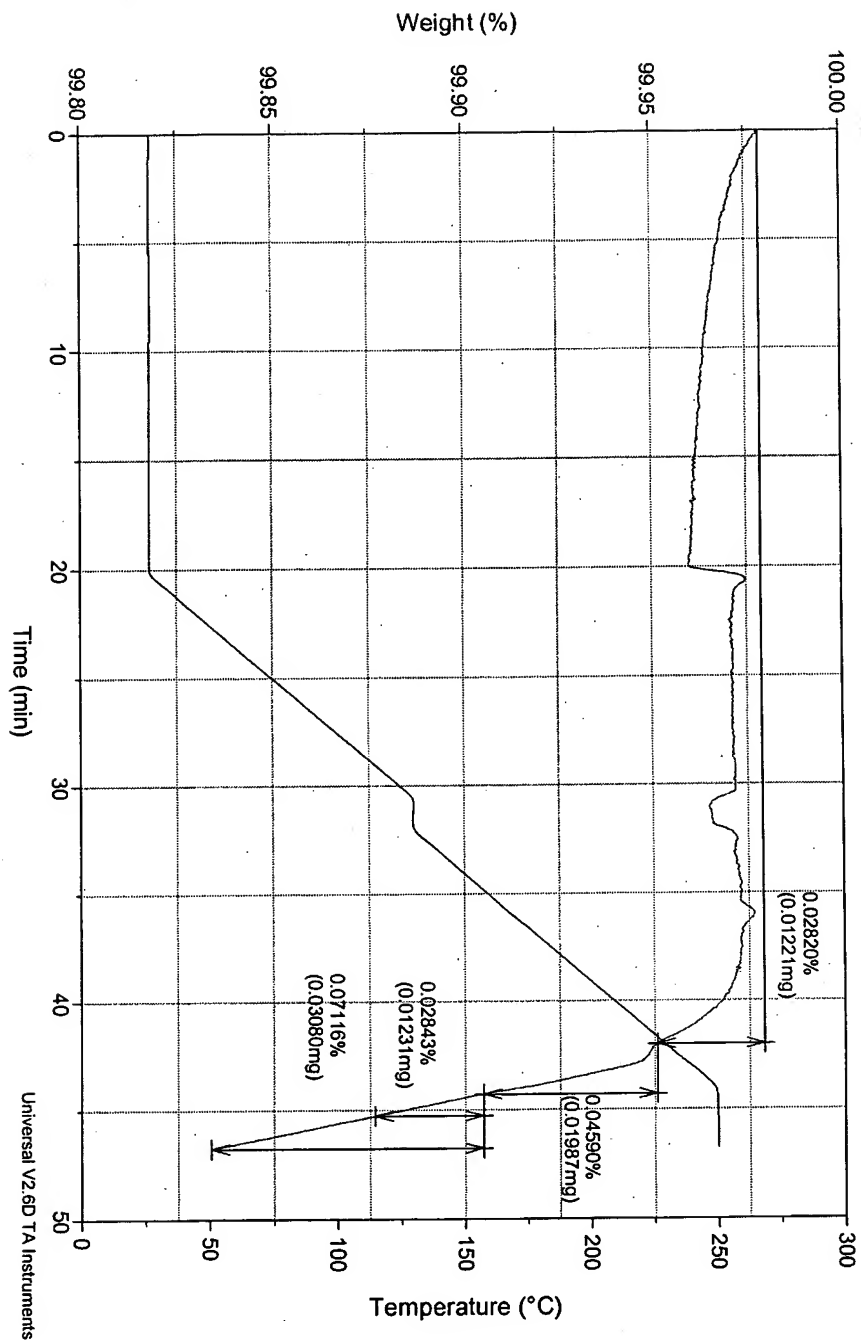


Figure 5

Table 3

Description	248 Absorb. Composition		193 Absorb. Comp. PDR		193 Absorb. Comp. Rev A		193 Absorb. Comp. Rev C		193 Absorb. Comp. Rev C		193 Absorb. Comp. (no acetone) + 5% DPG		193 Absorb. Comp. + 383ppm TMAH triflate		193 Absorb. Comp. + 1070ppm APTEOS triflate		193 AC. + 383ppm TMAH triflate + 3% DPG	
	130/200°C	150/250°C	193 Absorb. Comp. Rev A	193 Absorb. Comp. Rev C	193 Absorb. Comp. Rev C	193 Absorb. Comp. Rev C	193 Absorb. Comp. Rev C	193 Absorb. Comp. Rev C	193 Absorb. Comp. Rev C	193 Absorb. Comp. Rev C	193 Absorb. Comp. Rev C	193 Absorb. Comp. Rev C	193 Absorb. Comp. Rev C	193 Absorb. Comp. Rev C	193 Absorb. Comp. Rev C	193 Absorb. Comp. Rev C	193 Absorb. Comp. Rev C	193 Absorb. Comp. Rev C
Bake Sequence		50 sec each																
500:1BOE @ 21°C	30 sec	1224				2012	248		133		411			962		933		[1116]
	1 min	1000	560			[1568]	306		201		531		TBD	820		[1030]		[1069]
	2 min										536					854		
TMAH	1 min @	Pre	ER	Pre	ER	Pre	ER	Pre	ER	Pre	ER	Pre	ER	Pre	ER	Pre	ER	Pre
2.3% aq. TMAH	23°C	3529	2731	2702	2684	2691	2695	2312	2670	2676	2677	2692	2699	2705	2692	2699	3543	3543
	50°C	3534	2715	2702	2663	2686	2701	2331	2693	2663	2677	2694	2693	2705	2692	2705	3516	3516
	75°C	3496	2720	2702	2702	2720	2672	2323	2694	2677	2692	2694	2694	2705	2692	2705	3588	3588
5.0% aq. TMAH	23°C	3526	2705	2702	2679	2739	2693	2311	2702	2716	2716	2702	2698	2752	2698	2702	3563	3563
	50°C	3487	2774	2702	2723	2702	2672	2327	2688	2673	2673	2688	2752	2752	2702	2752	3519	3519
	75°C	3530	2709	2709	2699	2709	2725	2361	2686	2673	2673	2686	2702	2702	2702	2702	3503	3503
10.0% aq. TMAH	23°C	3497	2724	2702	2687	2702	2670	2318	2691	2672	2672	2691	2700	2700	2700	2700	3469	3469
	50°C	3525	2722	2693	2670	2693	2679	2327	2693	2666	2666	2693	2576	2576	2576	2576	3483	3483
	75°C	3519	2696	2709	2706	2709	2688	2316	2731	2653	2653	2731	3543	3543	3543	3543	3532	3532

Table 4

248 Absorbing Comp.		193 Absorbing Comp.		193 Absorb. Comp.		193 Absorb. Comp.		193 Absorb. Comp.	
Description		Rev C		+1070ppm APTEOS triflate		+1070ppm APTEOS triflate		+1070ppm APTEOS triflate + 1.5%DPG	
pH		<1		<1		<1		<1	
Bake Sequence		130/160 C		130/160 C		130/200 C		130/240 C	
		50 sec							
		90s							
500:1 BOE	1 min @ 20 °C	Pre	ER	Pre	ER	Pre	ER	Pre	ER
		3533	[873]	1676	268	2741	[1098]	2724	[1071]
		Pre	ER	Pre	ER	Pre	ER	Pre	ER
2.3% aq. TMAH	23 °C	3527	74	1690	0	2720	6	2747	28
	50 °C	3524	572	1676	7	2722	4	2729	7
	75 °C	3540	1555	1676	28	2743	127	2743	97
5.0% aq. TMAH	23 °C	3534	[480]	1681	8	2701	15	2722	23
	50 °C	3543	>3488	1676	12	2709	80	2717	58
	75 °C	3527	>3527	1687	45	2715	272	2713	192
10.0% aq. TMAH	23 °C	3539	>3477	1690	11	2734	39	2741	35
	50 °C	3532	>3532	1682	17	2736	259	2749	224
	75 °C	3533	>3533	1674	109	2701	515	2726	518

193 Absorb.	193 Absorb.	193 Absorb.	193 Absorb.	193 Absorb.
Comp.	Comp.	Comp.	Comp.	Comp.

Description	+1070ppm APTEOS triflate + 1.5%DPG		+1070ppm APTEOS triflate + 3%DPG		+1070ppm APTEOS triflate + 3%DPG		170ppm Ammonium Triflate		170ppm Ammonium Triflate + 3% DPG		170ppm Ammonium Triflate + 3% DPG	
	Pre	ER	Pre	ER	Pre	ER	Pre	ER	Pre	ER	Pre	ER
pH	<1		<1		<1		<1		<1		<1	
Bake Sequence	130/240 C		130/200 C		130/240 C		130/200 C		130/200 C		130/240 C	
90s												
500:1 BOE	1 min @ 20 °C	Pre 3214	ER [1432]	Pre 3507	ER [1476]	Pre 3548	ER [1065]	Pre 2751	ER [1115]	Pre 2971	ER [1614]	Pre 2982
2.3% aq. TMAH	1 min @	Pre	ER	Pre	ER	Pre	ER	Pre	ER	Pre	ER	Pre
	23 °C	3218	123	3523	83	3564	29	2732	19	2951	38	2972
	50 °C	3184	1163	3510	>3510	3529	>3529	2746	76	2997	655	2960
75 °C	3202	>3202	3505	3505	>3505	3519	>3519	2736	325	2977	>2977	2992
5.0% aq. TMAH	23 °C	3194	102	3533	[1125]	3519	[482]	2744	33	2972	223	2952
	50 °C	3175	>3175	3505	>3505	3479	>3479	2725	254	2983	[2050]	2943
	75 °C	3165	>3165	3495	>3495	3487	>3487	2750	558	2973	>2973	2953
10.0% aq. TMAH	23 °C	3200	[592]	3563	[3203]	3496	1746	2702	124	2979	1014	2949
	50 °C	3176	>3176	3504	>3504	3496	>3496	2761	619	2983	>2983	2949
	75 °C	3187	>3187	3534	>3534	3500	>3477	2766	991	2986	>2986	2992

Table 6

248 Absorb. 193 Abs. 193 Absorb. 193 Absorb. 193 Abs.		Comp.		Comp.		Comp.		Comp.		193 Absorb. 193 Abs.		Comp.		193 Absorb. 193 Abs.		Comp.		193 Absorb. 193 Abs.		Comp.	
Compos.		Comp.		Comp.		Comp.		Comp.		Comp.		Comp.		Comp.		Comp.		Comp.		Comp.	
Description		+1070ppm APTEOS Triflate + 0.5% DPG		+1070ppm APTEOS Triflate + 1.5% DPG		+1070ppm "optimized" APTEOS Triflate + 0.25% DPG		+1070ppm "optimized" APTEOS Triflate + 0.5% DPG		+1070ppm "optimized" APTEOS Triflate + 1% DPG		+1070ppm "optimized" APTEOS Triflate + 1.5% DPG		+1070ppm "optimized" APTEOS Triflate + 1.5% DPG		+1070ppm "optimized" APTEOS Triflate + 1.5% DPG		+1070ppm "optimized" APTEOS Triflate + 1.5% DPG		+1070ppm "optimized" APTEOS Triflate + 1.5% DPG	
pH		N/A		<1		<1		<2		<2		<2		<2		<2		<2		<2	
Bake Sequence		130/200 C		130/200 C		130/200 C		130/200 C		130/200 C		130/200 C		130/200 C		130/200 C		130/200 C		130/200 C	
		50 sec		90 sec		90 sec		90 sec		90 sec		90 sec		90 sec		90 sec		90 sec		90 sec	
500:1 BOE	1 min @ 20 °C	Pre	ER	Pre	ER	Pre	ER	Pre	ER	Pre	ER	Pre	ER	Pre	ER	Pre	ER	Pre	ER	Pre	ER
		3487	[977]	2869	[1409]	3177	[1601]	2879	[1512]	2902	[1602]	2934	[1602]	2907	[1577]	2934	[1602]	2907	[1577]	2934	[1602]
2.3% aq. TMAH	1 min @ 23 °C	Pre	ER	Pre	ER	Pre	ER	Pre	ER	Pre	ER	Pre	ER	Pre	ER	Pre	ER	Pre	ER	Pre	ER
		3492	127	2847	18	3190	16	2854	28	2934	42	2934	42	2957	55	2934	42	2957	55	2934	42
	50 °C	3463	723	2886	94	3190	1805	2893	279	2887	447	2887	447	2955	798	2887	447	2955	798	2887	447
5.0% aq. TMAH	75 °C	3494	1987	2875	861	3203	>3203	2864	[1519]	2885	>2779	2885	>2779	2987	>2987	2885	>2779	2987	>2987	2885	>2779
		3496	[812]	2893	17	3182	95	2853	55	2898	95	2898	95	2927	158	2898	95	2927	158	2898	95
	50 °C	3520	>3520	2857	356	3189	>3189	2844	739	2910	1085	2910	1085	2932	[1939]	2910	1085	2932	[1939]	2910	1085
10.0% aq. TMAH	75 °C	3506	>3506	2858	[1600]	3184	>3184	2850	>2771	2926	>2926	2926	>2926	2926	>2926	2926	>2926	2926	>2926	2926	>2926
		3499	>3499	2877	163	3187	2803	2871	715	2967	[1352]	2967	[1352]	2977	[2258]	2967	[1352]	2977	[2258]	2967	[1352]
	50 °C	3522	>3522	2848	1195	3215	>3215	2899	>2899	2906	>2906	2906	>2906	2942	>2942	2906	>2906	2942	>2942	2906	>2906
	75 °C	3542	>3542	2851	>2851	3186	>3186	2885	>2885	2897	>2897	2897	>2897	2991	>2991	2897	>2897	2991	>2991	2897	>2897
		3542	>3542	2851	>2851	3186	>3186	2885	>2885	2897	>2897	2897	>2897	2991	>2991	2897	>2897	2991	>2991	2897	>2897

Table 7

Description	193 Absorb. Comp.		193 Absorb. Comp.		193 Absorb. Comp.		193 Absorb. Comp.		193 Absorb. Comp.		193 Absorb. Comp.	
	+ 170ppm Ammonium Triflate + 0.25% DPG	+ 170ppm Ammonium Triflate + 0.5% DPG	170ppm Ammonium Triflate + 1% DPG	383ppm TMAH-MSA	383ppm TMAH-MSA + 1.5% DPG	1070ppm APTEOS-MSA	1070ppm APTEOS-MSA + 1.5% DPG					
pH	<2	<2	<2	<2	<2	<2	<2					
Bake Sequence	130/200 C		130/200 C		130/200 C		130/200 C		130/200 C			
	90 sec		90 sec		90 sec		90 sec		90 sec			
500:1 BOE	1 min @ 20 °C	Pre	ER	Pre	ER	Pre	ER	Pre	ER	Pre	ER	Pre
		2804	[1102]	2830	[1149]	2931	[1283]	2823	2816	2895	2768	2839
2.3% aq. TMAH	1 min @ 23 °C	Pre	ER	Pre	ER	Pre	ER	Pre	ER	Pre	ER	Pre
		2786	273	2821	16	2924	54	2812	2828	240	2777	2834
	50 °C	2827	36	2835	120	2881	201	2769	2810	18	2765	2831
5.0% aq. TMAH	75 °C	2762	415	2854	678	2897	1032	2755	2848	293	2794	2812
												507
	23 °C	2777	29	2841	27	2883	40	2773	2811	23	2821	2868
10.0% aq. TMAH	50 °C	2785	206	2871	278	2903	464	2797	2852	34	2763	2871
	75 °C	2809	586	2843	867	2937	1827	2779	2824	457	2804	2848
												695
10.0% aq. TMAH	23 °C	2785	102	2840	138	2885	223	2770	2827	29	2806	2811
	50 °C	2782	605	2818	775	2914	1533	2843	2790	840	2792	2863
	75 °C	2781	1100	2846	1695	2878	12878	2799	2793	849	2777	2847

193	193	193	193	193
Absorb.	Absorb.	Absorb.	Absorb.	Absorb.
Compos.	Comp.	Comp.	Comp.	Comp.

Description	+ 2140ppm "optimized" APTEOS triflate + 0.16% DPG		+ 2140ppm "optimized" APTEOS triflate + 0.25% DPG		+ 170ppm "optimized" Ammonium triflate + 0.75% DPG		+ 170ppm "optimized" Ammonium triflate + 1% DPG		+ 225ppm "optimized" Ammonium triflate + 0.75% DPG		+ 225ppm "optimized" Ammonium triflate + 1% DPG		+ 340ppm "optimized" Ammonium triflate + 1% DPG		
	Pre	ER	Pre	ER	Pre	ER	Pre	ER	Pre	ER	Pre	ER	Pre	ER	
pH	<2		<2		<2		<2		<2		<2		<2		
	130/200 C		130/200 C		130/200 C		130/200 C		130/200 C		130/200 C		130/200 C		
Bake Sequence	90 sec		90 sec		90 sec		90 sec		90 sec		90 sec		90 sec		
	1 min @ 20 °C	Pre 2970	ER [1527]	Pre 2933	ER [1485]	Pre 2905	ER [1313]	Pre 2696	ER [1130]	Pre 2902	ER [1272]	Pre 2938	ER [1314]	Pre 2970	ER [1395]
2.3% aq. TMAH	1 min @	Pre	ER	Pre	ER	Pre	ER	Pre	ER	Pre	ER	Pre	ER	Pre	ER
	23 °C	2995	73	2962	76	2913	70	2913	63	2920	71	2936	88	2949	63
	50 °C	2965	248	2947	195	2929	171	2929	211	2908	167	2932	220	2951	215
5.0% aq. TMAH	75 °C	2970	[1608]	2946	[1166]	2914	[1035]	2959	[1541]	2941	[1071]	2962	[1569]	2998	[1563]
	23 °C	2959	137	2932	103	2905	87	2924	90	2936	91	2929	133	2960	105
	50 °C	2968	591	2942	462	2915	405	2914	486	2923	412	2980	567	2991	548
10.0% aq. TMAH	75 °C	2943	[2608]	2983	[1665]	2948	[1398]	2932	[2138]	2945	[1664]	2940	[2166]	2974	>2974
	23 °C	2982	186	2937	147	2915	89	2944	124	2919	124	2962	117	2989	189
	50 °C	3012	1516	2950	1187	2934	1028	2978	1274	2909	1170	2908	1253	3008	1476
75 °C	2966	>2966	2971	>2971	2879	>2979	2923	>2923	2932	>2932	2937	>2937	2972	>2972	

Table 9

[illegible]

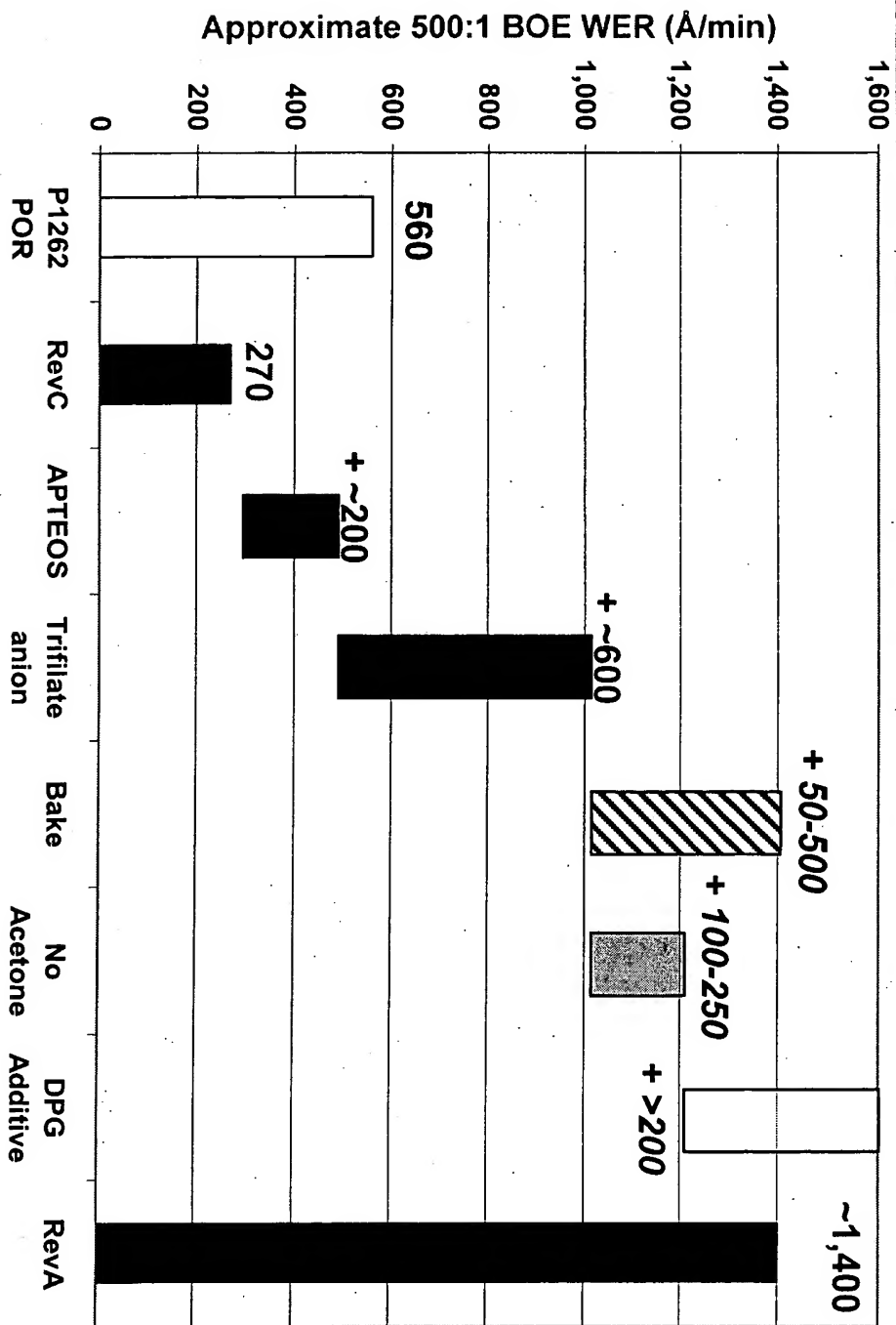


Figure 6

248		193		193		193		193	
Absorb. Composition		Absorb. Composition		Absorb. Composition		Absorb. Composition		Absorb. Composition	
Descriptions		+ 1070ppm APTEOS tosylate		+ 1070ppm APTEOS tosylate		+ 1070ppm APTEOS tosylate + 5% DPG		+ 1070ppm APTEOS tosylate + 5% DPG	
pH		1.5		<1		<1		<1	
Bake temp. (C)/Time (Sec)		150/250C -- 50sec		130/200C -- 90sec		130/200C -- 90sec		130/240C -- 90sec	
Metrics		ER (A/min)		ER (A/min)		ER (A/min)		ER (A/min)	
2.5% TMAH @ 21°C	1 min	210		12		10		53	
	2 min	167		12		4		42	
500:1BOE @ 21°C	30 sec	1224		1440		[880]		[2405]	
	1 min	1000		>1215		845		>1309	
	2 min	[880]		>673		>689		>656	
ER: Etch Rate (A/min);									
Pre: Pre-Immersion SOG Film Average Thickness in Angstrom;									
> Bare Si post-etch.									
[] Post-etch film is highly non-uniformed.									

Table 10

248 Absorb. Composition 193 Absorb. Compos. 193 Absorb. Composition

Descriptions			RevA + 383ppm TMAH triflate	RevA + 383ppm TMAH tosylate
pH		N/A	<1	<1
Bake temp. (C)/Time (Sec)		130/200C -- 50sec	130/240C -- 90sec	130/240C -- 90sec
Metrics		ER (A/min)	ER (A/min)	ER (A/min)
2.5% TMAH @ 21°C	1 min	210	11	16
	2 min	167	4	8
500:1BOE @ 21°C	30 sec	1224	969	689
	1 min	1000	844	647
	2 min	[880]	[854]	665
ER:	Etch Rate (A/min);			
Pre:	Pre-Immersion SOG Film Average Thickness in Angstrom;			
	ER > 1000A/min.			
	ER < 1000A/min.			
>	Bare Si post-etch.			
[]	Post-etch film is highly non-uniformed.			

Table II

Table 12

	"N" wt / Si comp. Wt (ppm)	"N" mole / Si comp. Wt (ppm)	"N" mole / Si comp. Wt (ppm) (consider 95% TMAA and 96% TMAN)
AS_TMAA	589	4.422	4.201
TMAN	601.2	4.416	4.239

Table 13

193 Absorbing Composition + TMAA

Bake temp. (C)/Time (Sec)		130/150C -- 90sec	130/175C -- 90sec	130/200C -- 90sec	130/225C -- 90sec	130/250C -- 90sec
Metrics		ER (A/min)	ER (A/min)	ER (A/min)	ER (A/min)	ER (A/min)
2.5% TMAH @ 21°C	1 min	-1	5	-7	-2	-3
	6 min	0.4	-0.6	-0.4	-0.2	-0.9
PGMEA @ 21°C	30 sec	358	251	206	165	144
	1 min	331	273	215	191	176

248
Absorb.
Comp.

193 Absorbing Comp. + TMAN

Bake temp. (C)/Time (Sec)		130/150C -- 90sec	130/175C -- 90sec	130/200C -- 90sec	130/225C -- 90sec	130/250C -- 90sec	130/200C -- 60sec
Metrics		ER (A/min)	ER (A/min)	ER (A/min)	ER (A/min)	ER (A/min)	ER (A/min)
2.5% TMAH @ 21°C	1 min	1	-3	-1	1	3	882
	6 min	-0.7	-0.2	-0.7	0.1	-0.1	21
PGMEA @ 21°C	30 sec	574	403	261	238	186	1140
	1 min	552	413	312	244	198	983

Spin Coated @ 7PM on 5/22/03; Wet Process

Figure 7

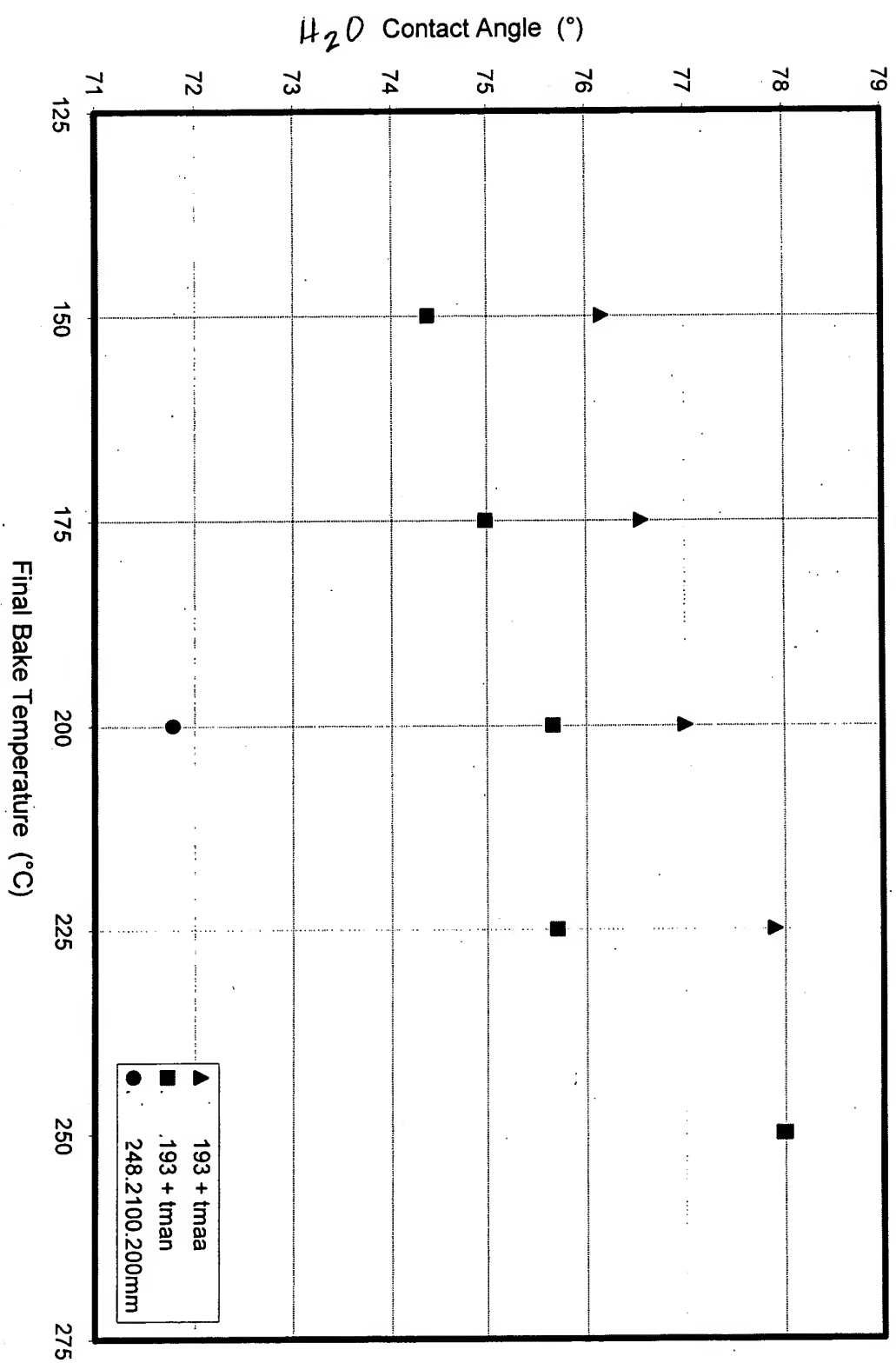
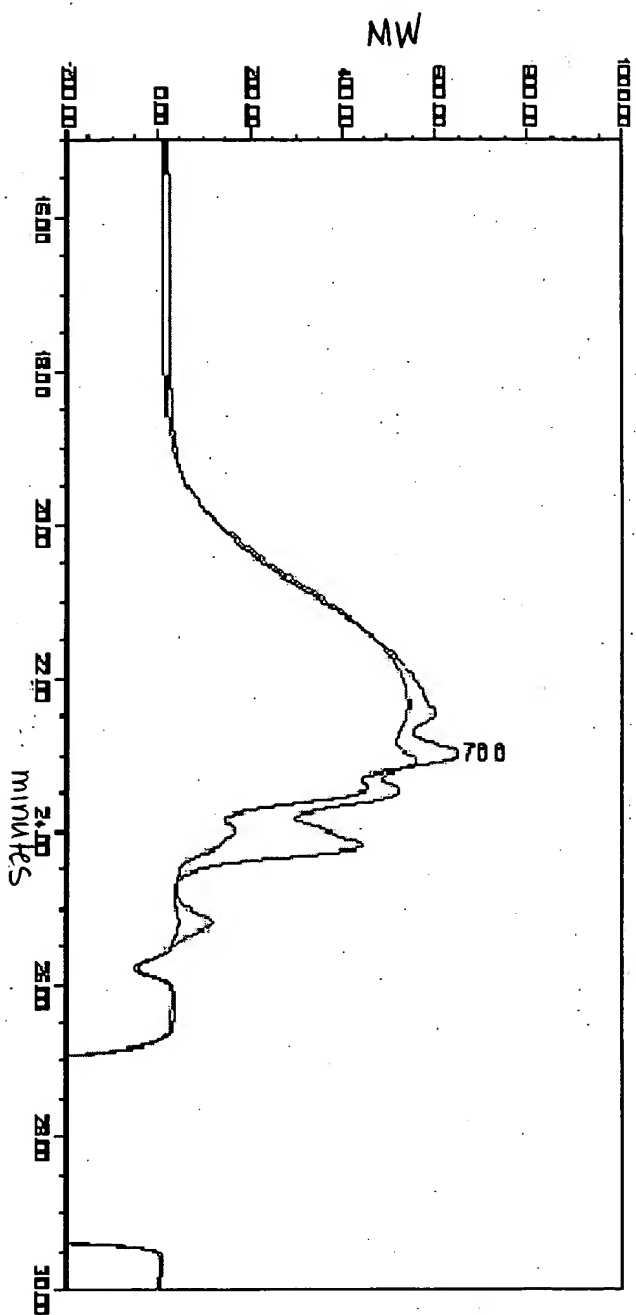


Figure 8



Product (Absorb. Comp.)	Mn	Mw	Mp	Mz	Mz+1	Polydispersity
193 + 600ppm Acidified TMAA	865	1183	737	1590	2012	1.367
w/ TMAA (after 5 days @ 40 C)	1021	1316	766	1671	2032	1.289
193 + 600ppm TMAN	789	1151	727	1582	1999	1.458
w/ TMAN (after 5 days @ 40 C)	848	1244	731	1706	2139	1.467

Figure 10

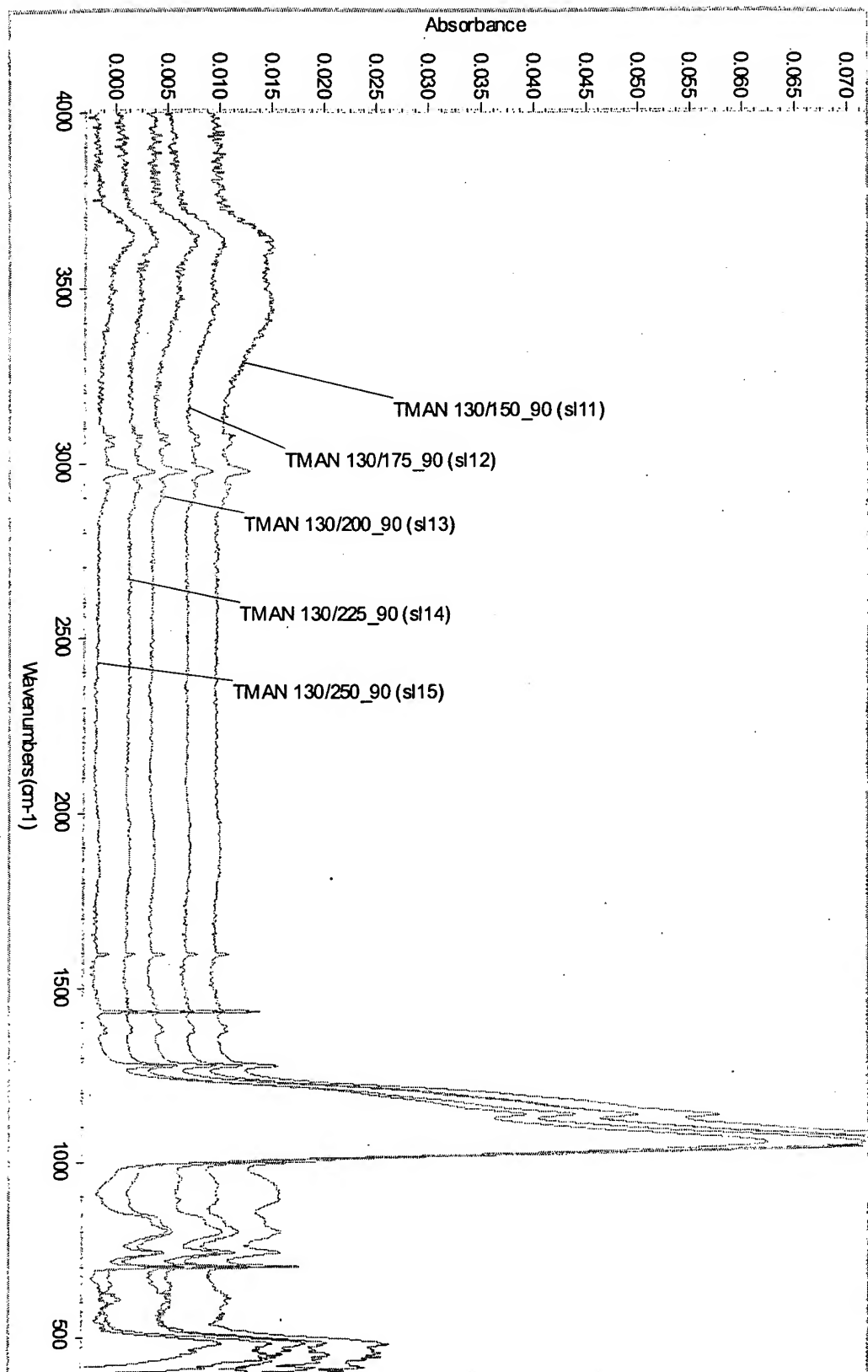


Figure 11

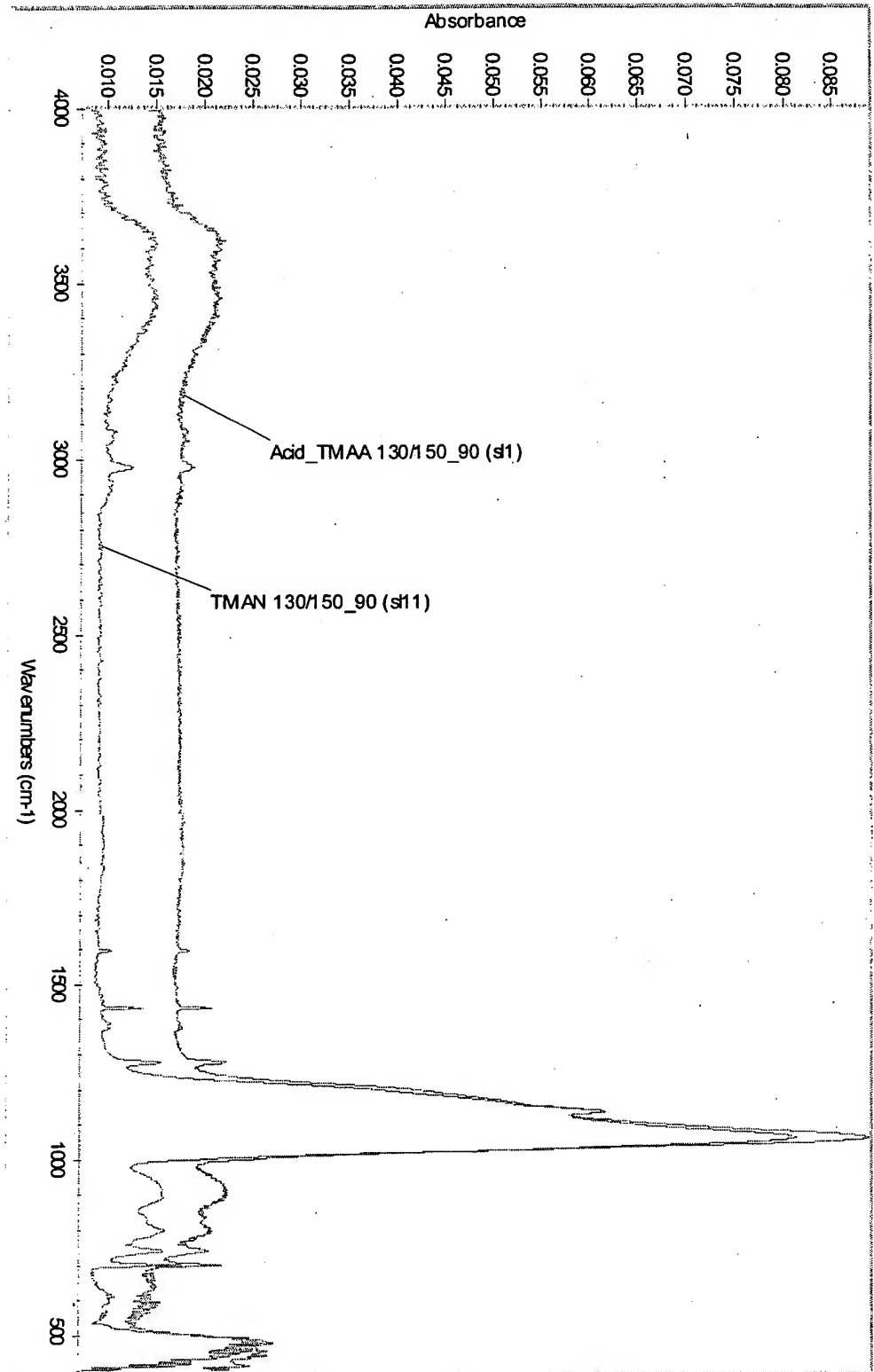


Figure 12

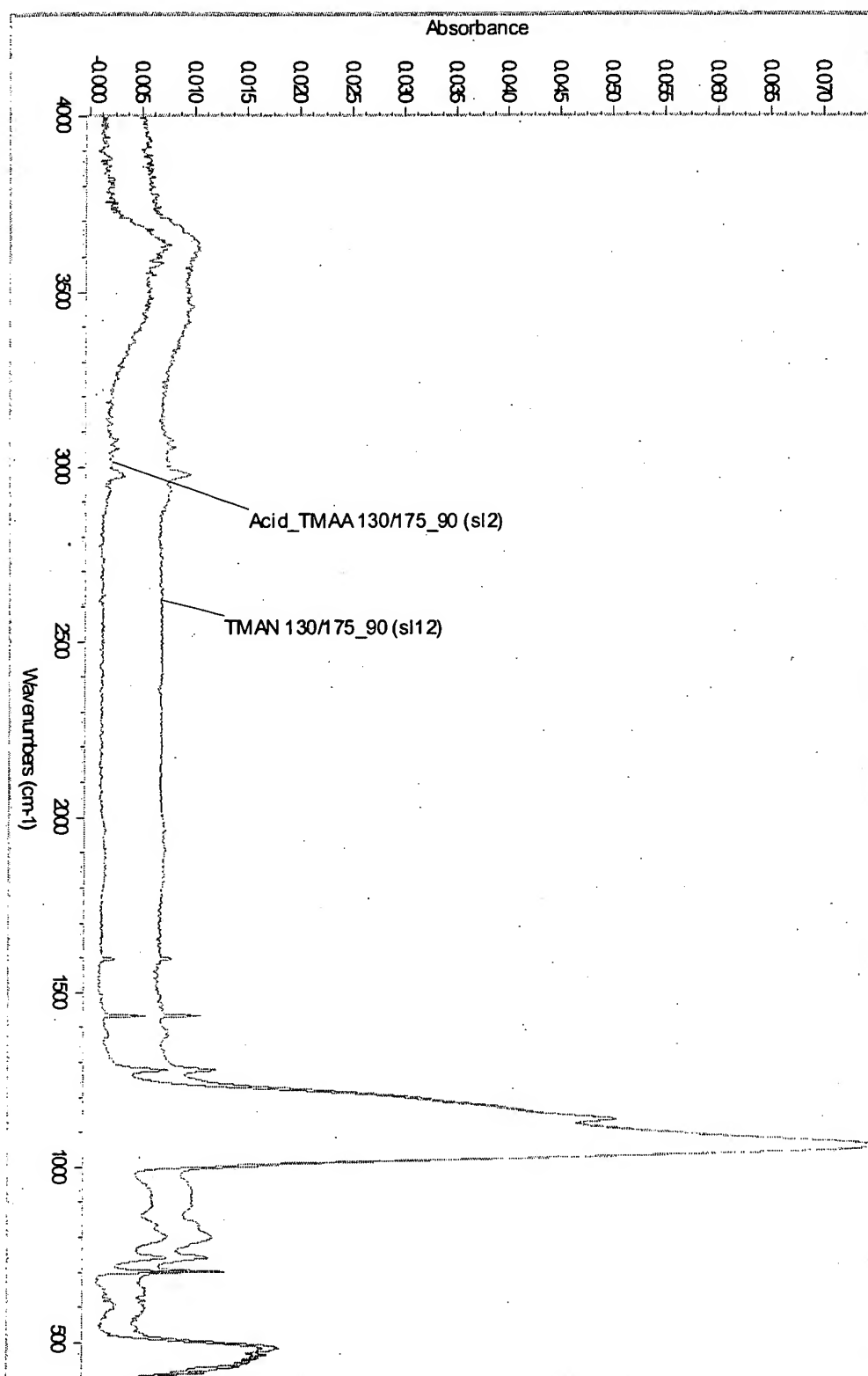


Figure 13

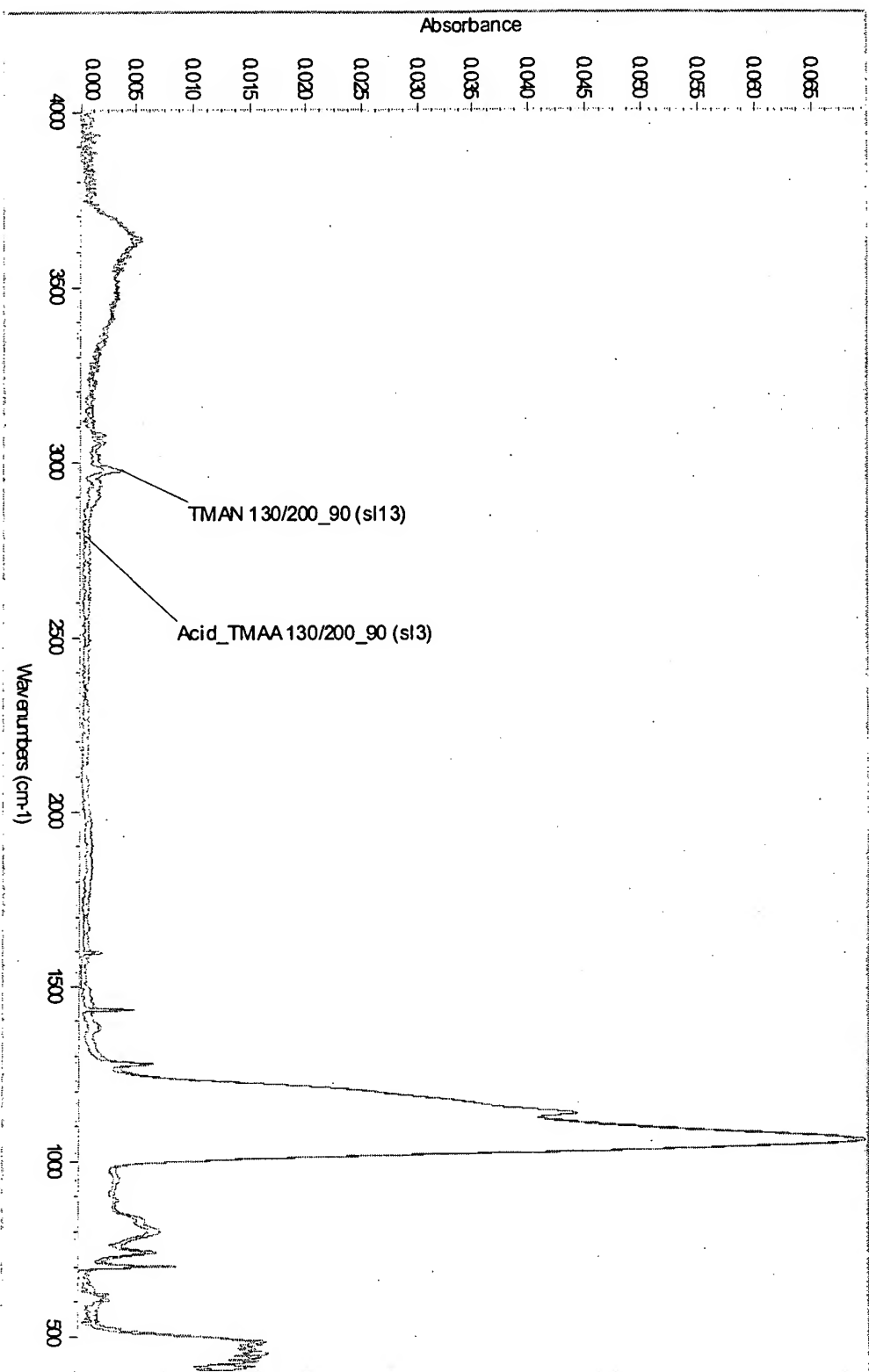


Figure 14

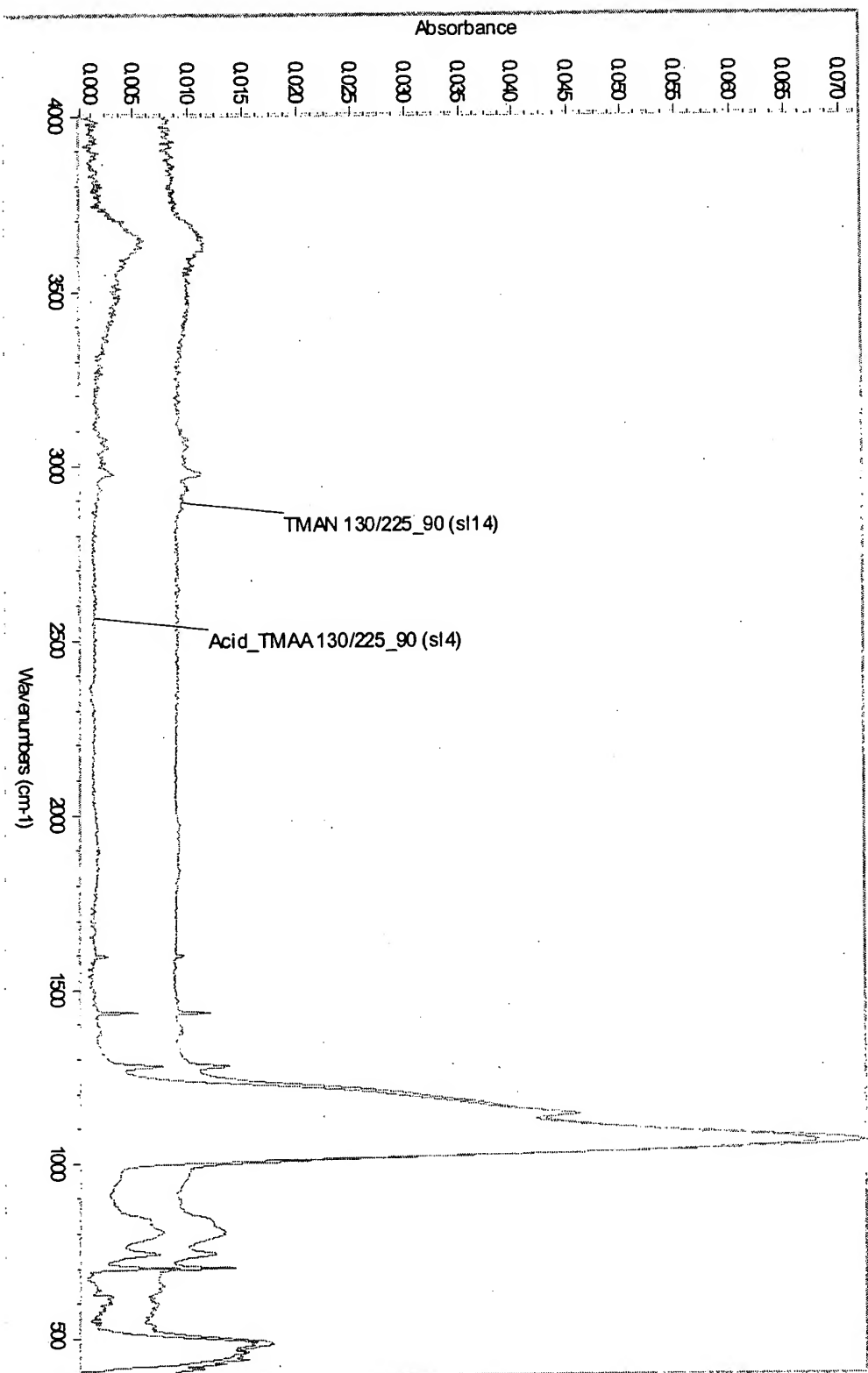


Figure 15

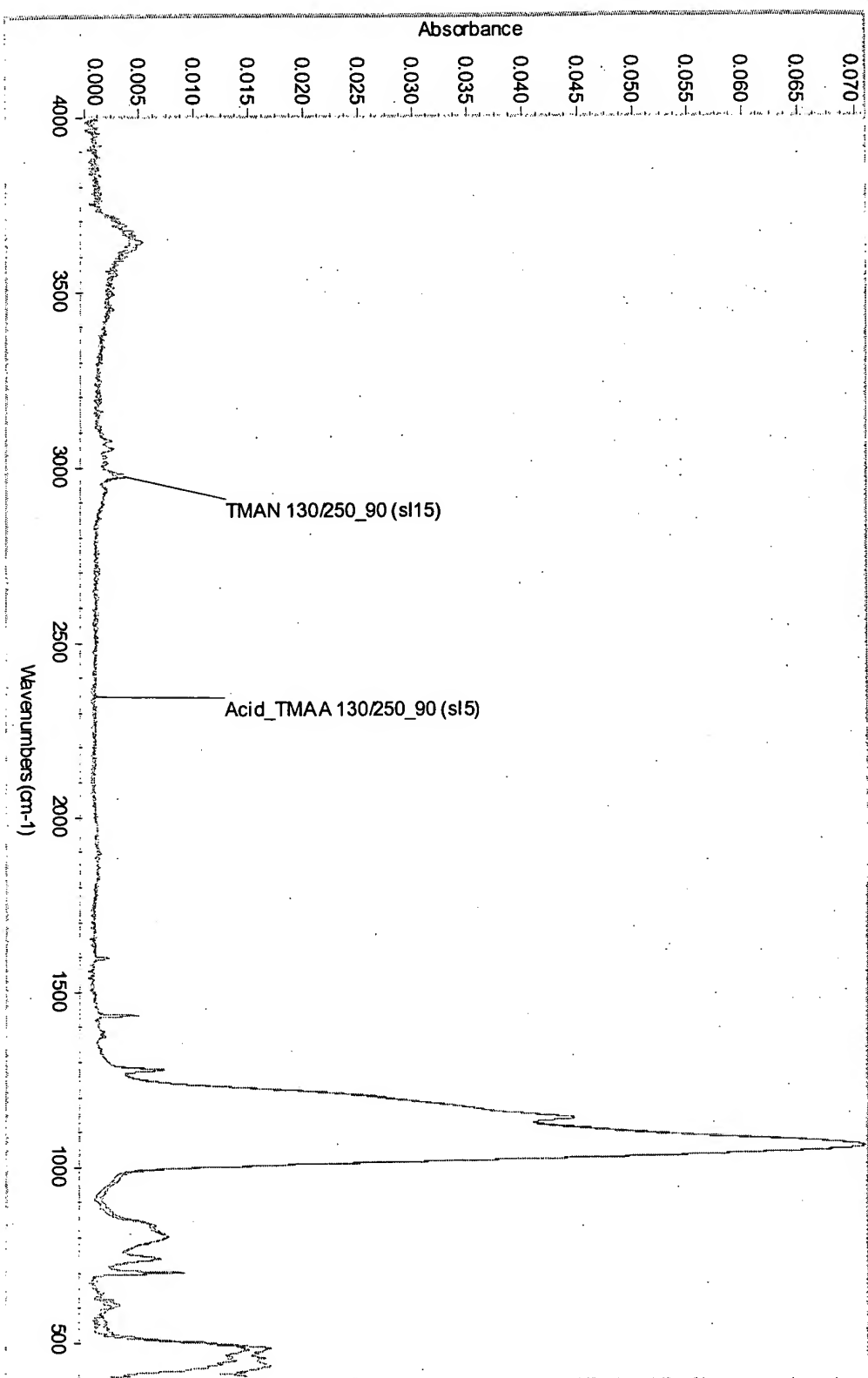


Figure 16

193 Absorb. Composition

Stabilized TMAA -vs- TMAN: Mw -vs- Aging

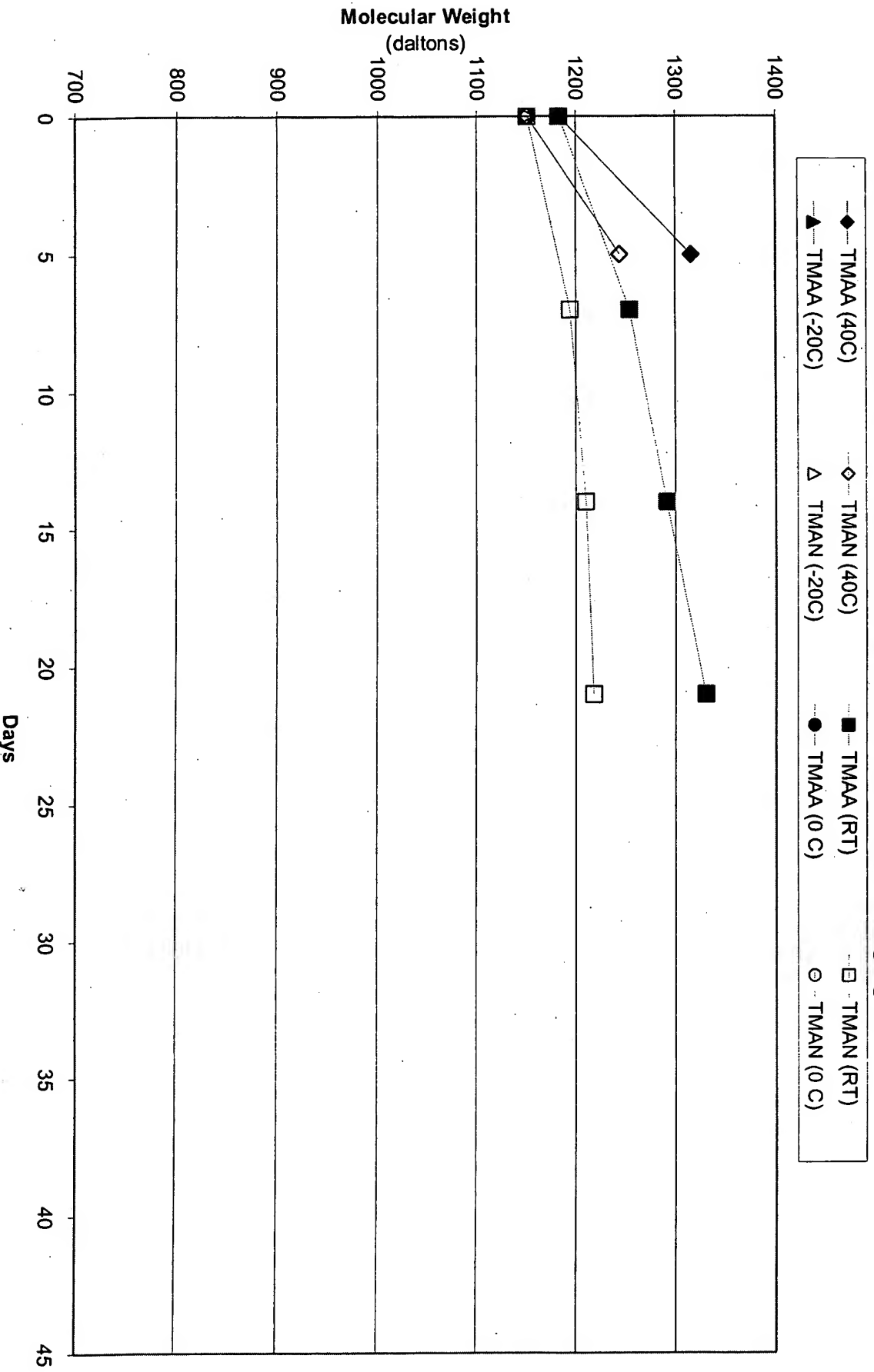
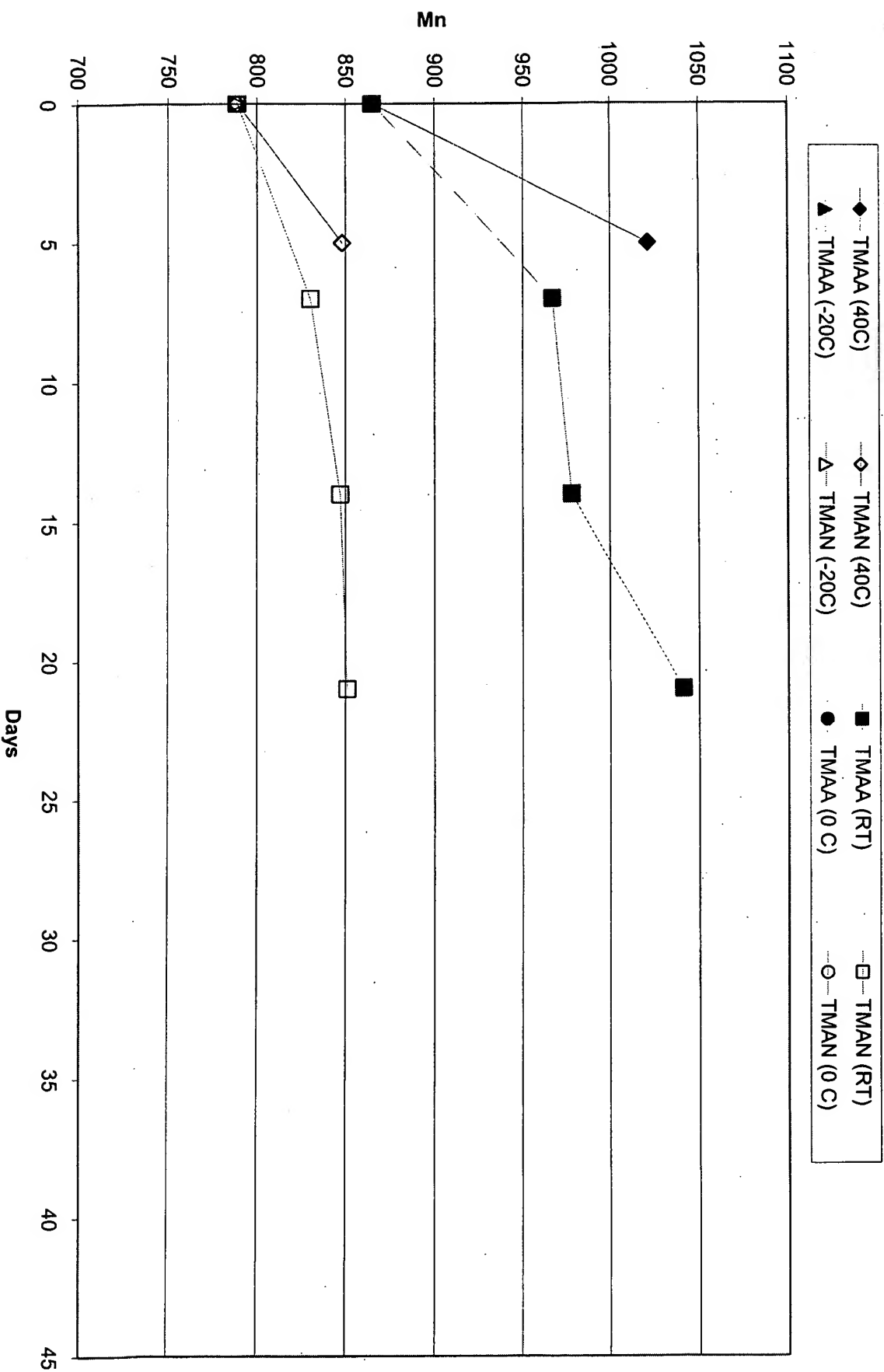


Figure 17

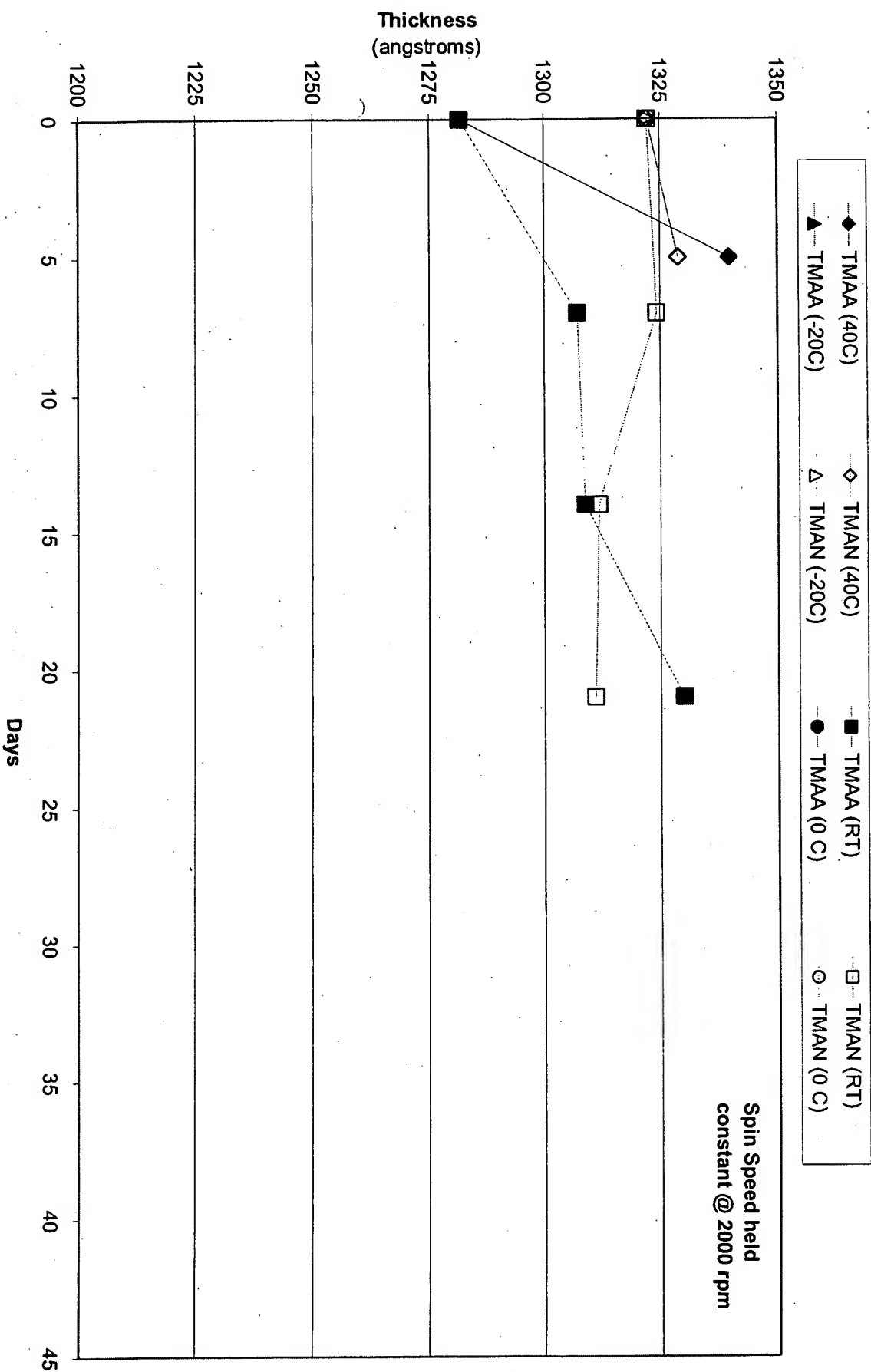
193 Absorb. Comp.

Stabilized TMAA -vs- TMAN: Mn -vs- Aging



193 Absorb. Comp.

Stabilized TMAA -vs- TMAN: Film Thickness -vs- Aging



93Ab50rb. Comp. Stabilized TMAA -vs- TMAN: Reflectance @ 193nm -vs- Aging

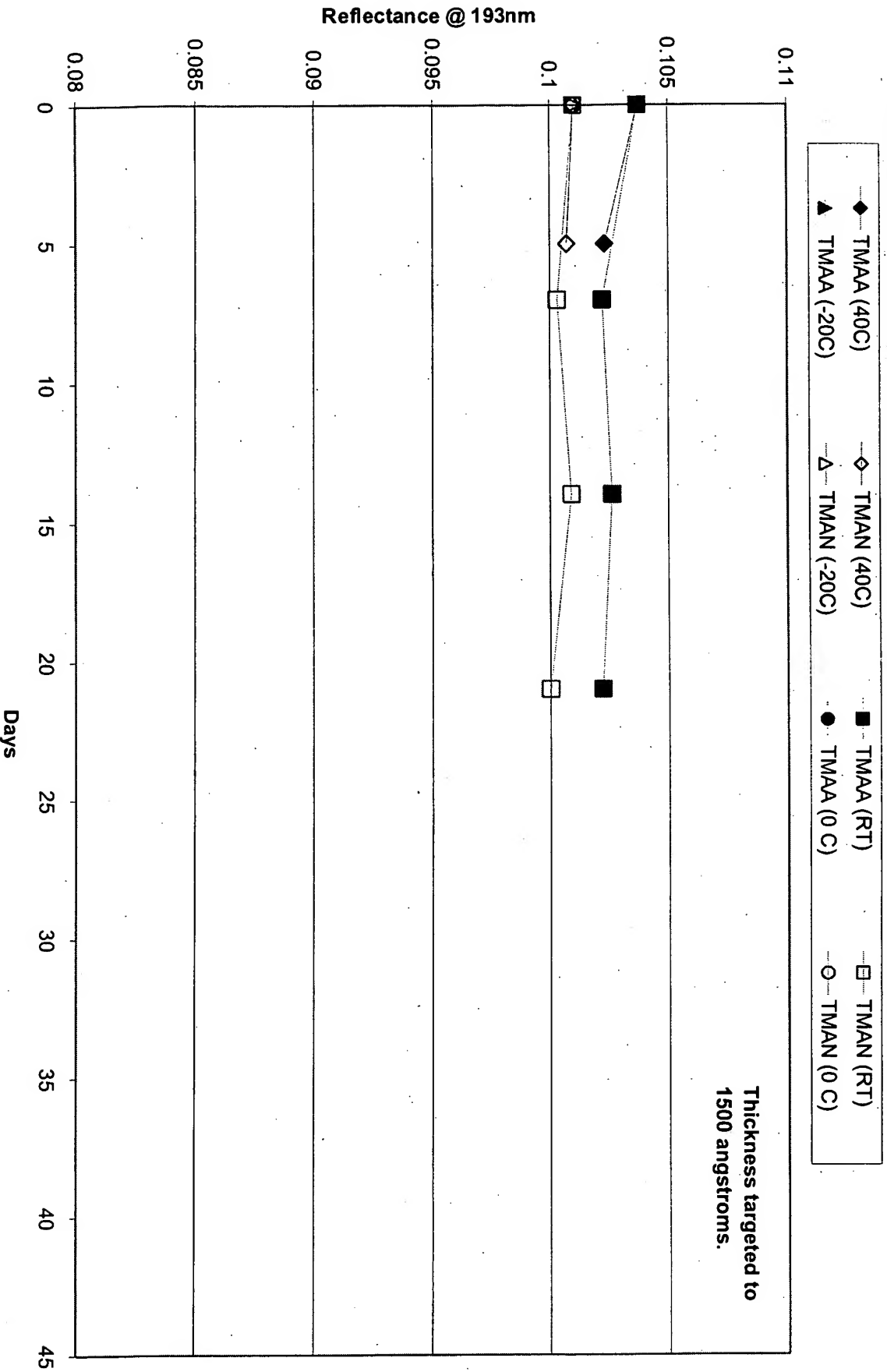


Figure 20

193 Abs. Comp.

Stabilized TMAA -vs- TMAN: Refractive Index @ 193nm -vs- Aging

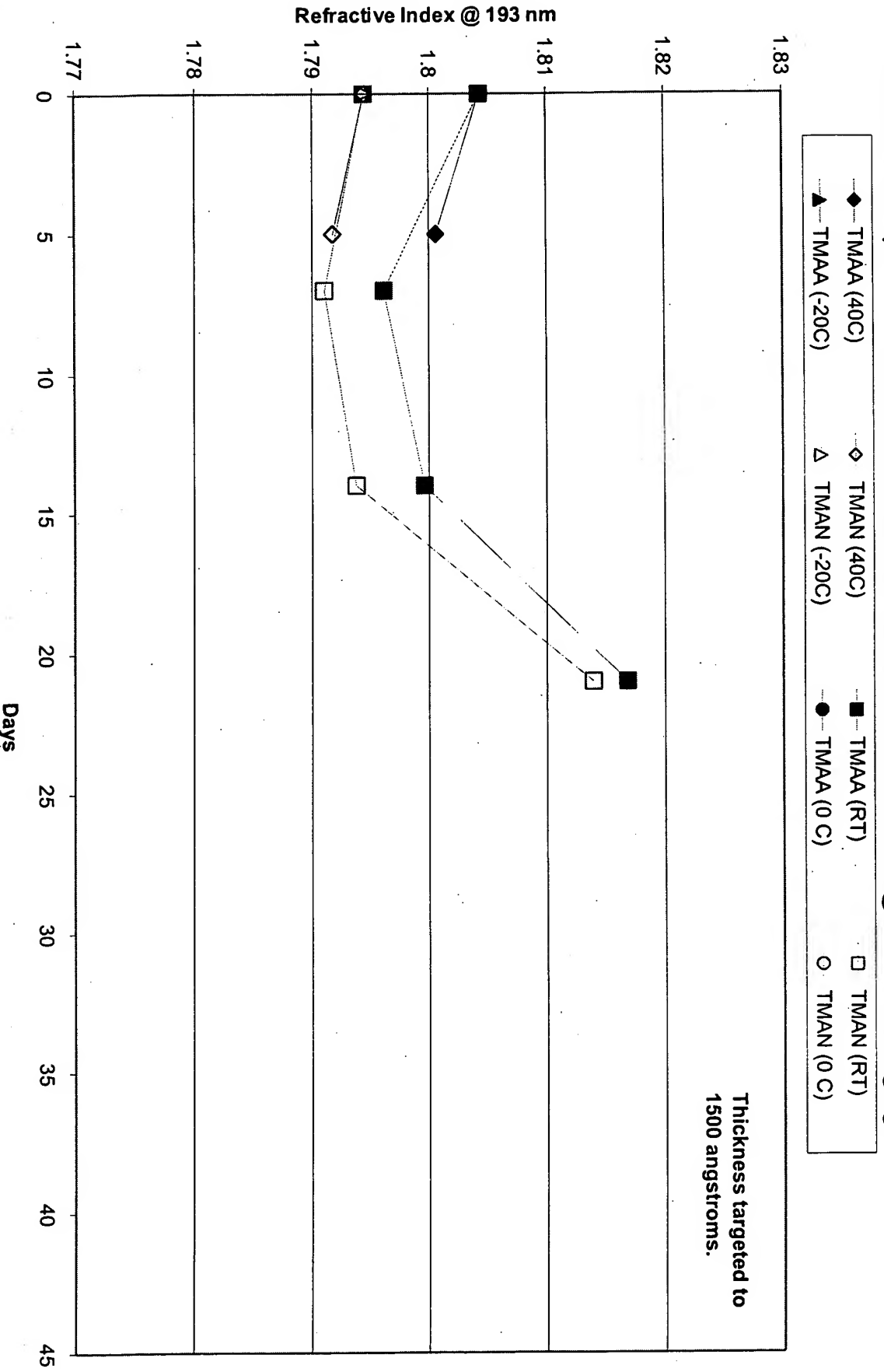


Figure 21

193 Absorb. Comp.

Stabilized TMAA -vs- TMAN: Extinction Coefficient @ 193nm -vs- Aging

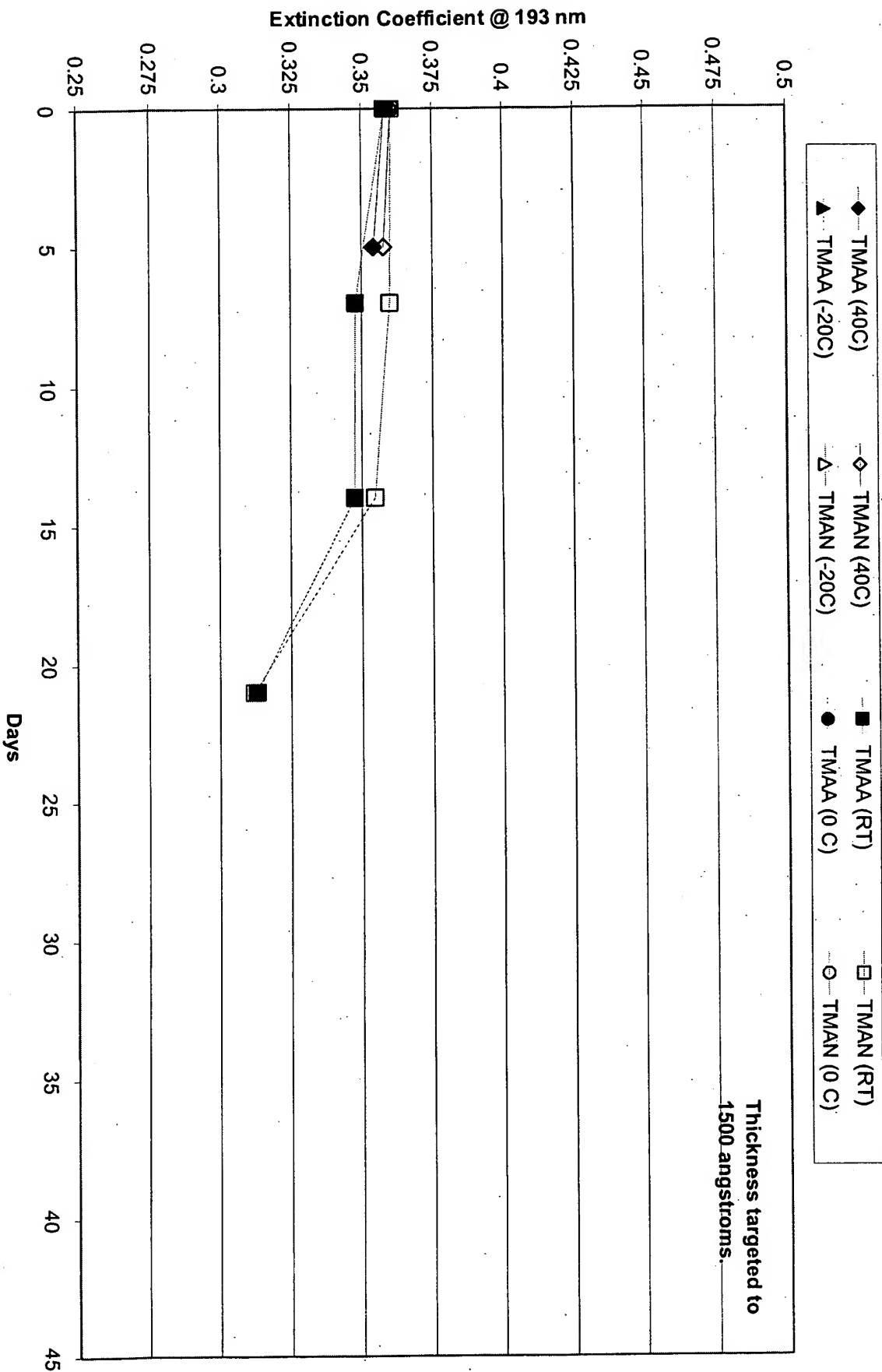


Figure 22

193 Absorb. Comp. Stabilized TMAA -vs- TMAN: Water Contact Angle -vs- Aging

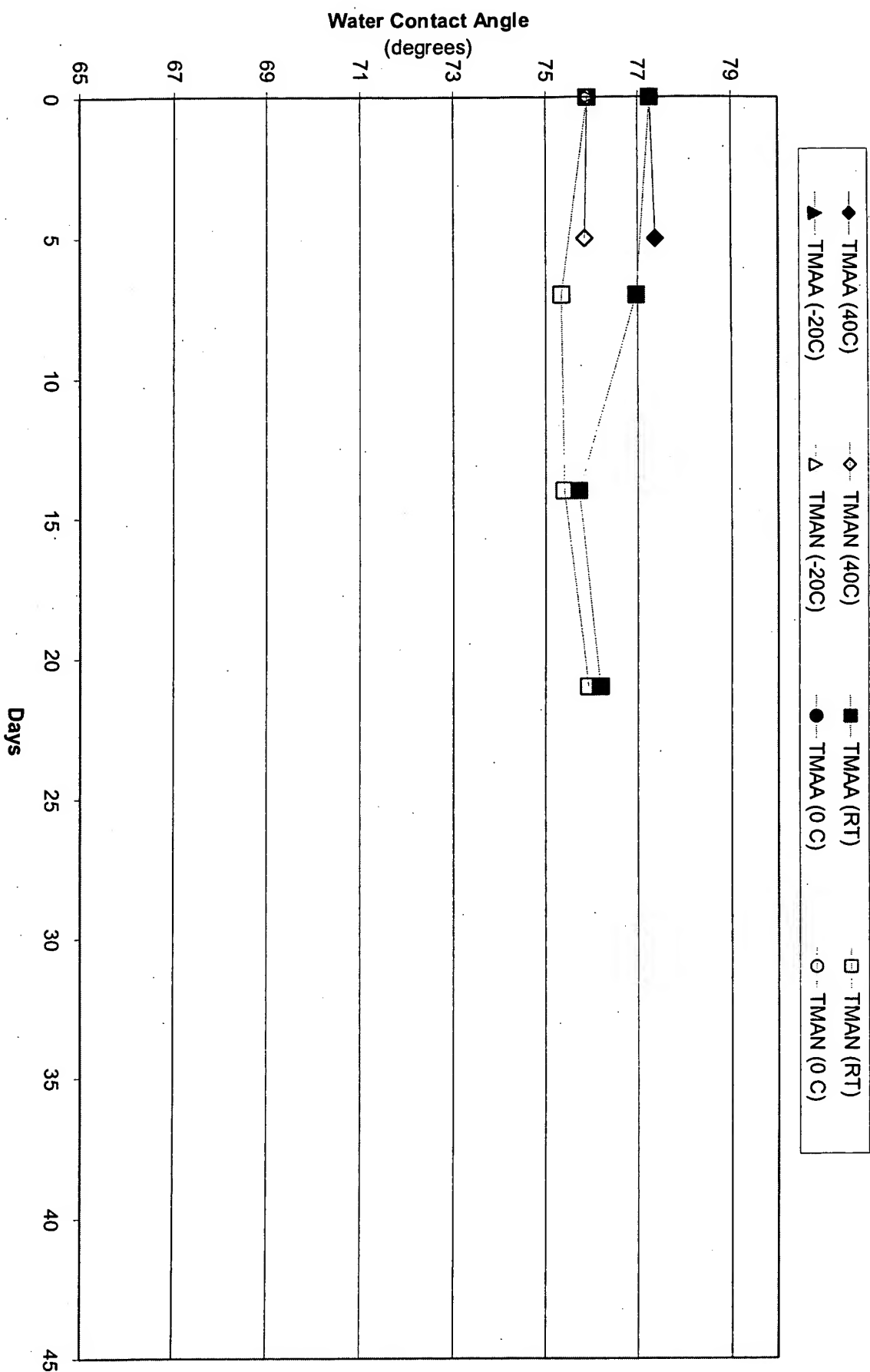


Figure 23

195 Abs. Comp.

Stabilized TMAA -vs- TMAN: Ethylene Glycol Contact Angle -vs- Aging

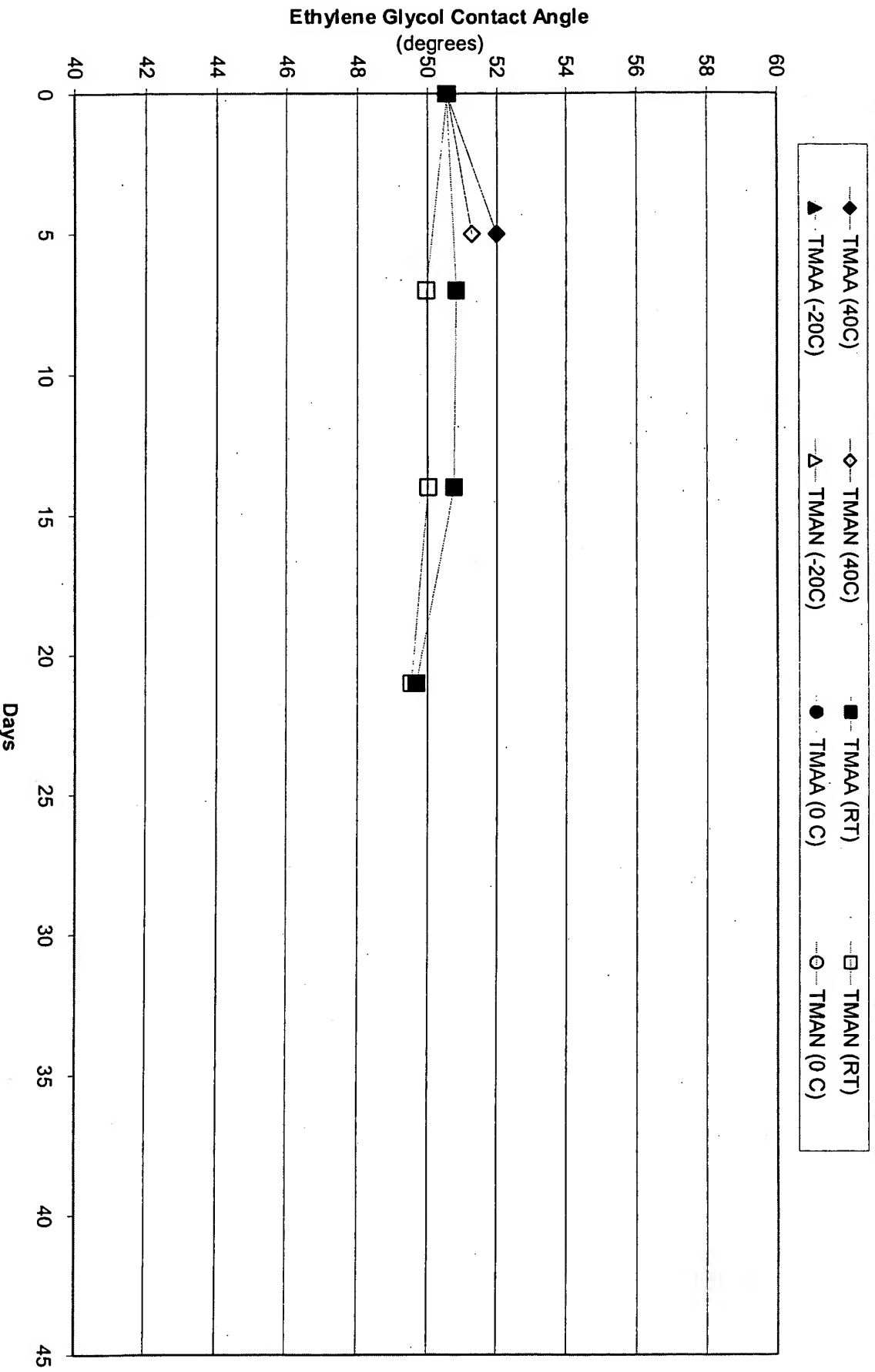


Figure 24

193465. Comp.

Stabilized TMAA -vs- TMAN: TMAH Resistance -vs- Aging

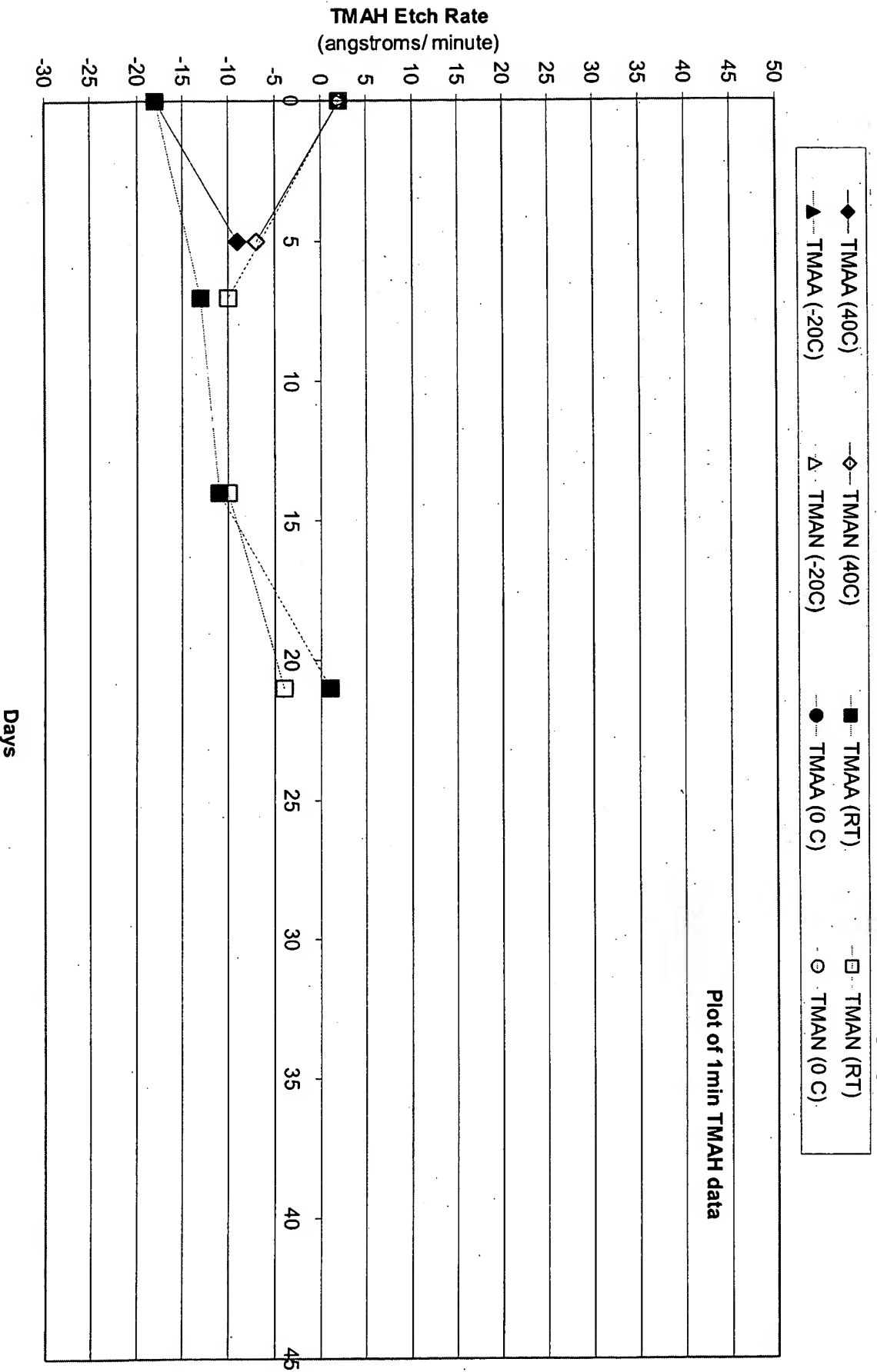


Figure 25

198 Abs. Comp. Stabilized TMAA -vs- TMAN: 500:1 BOE strip rate -vs- Aging

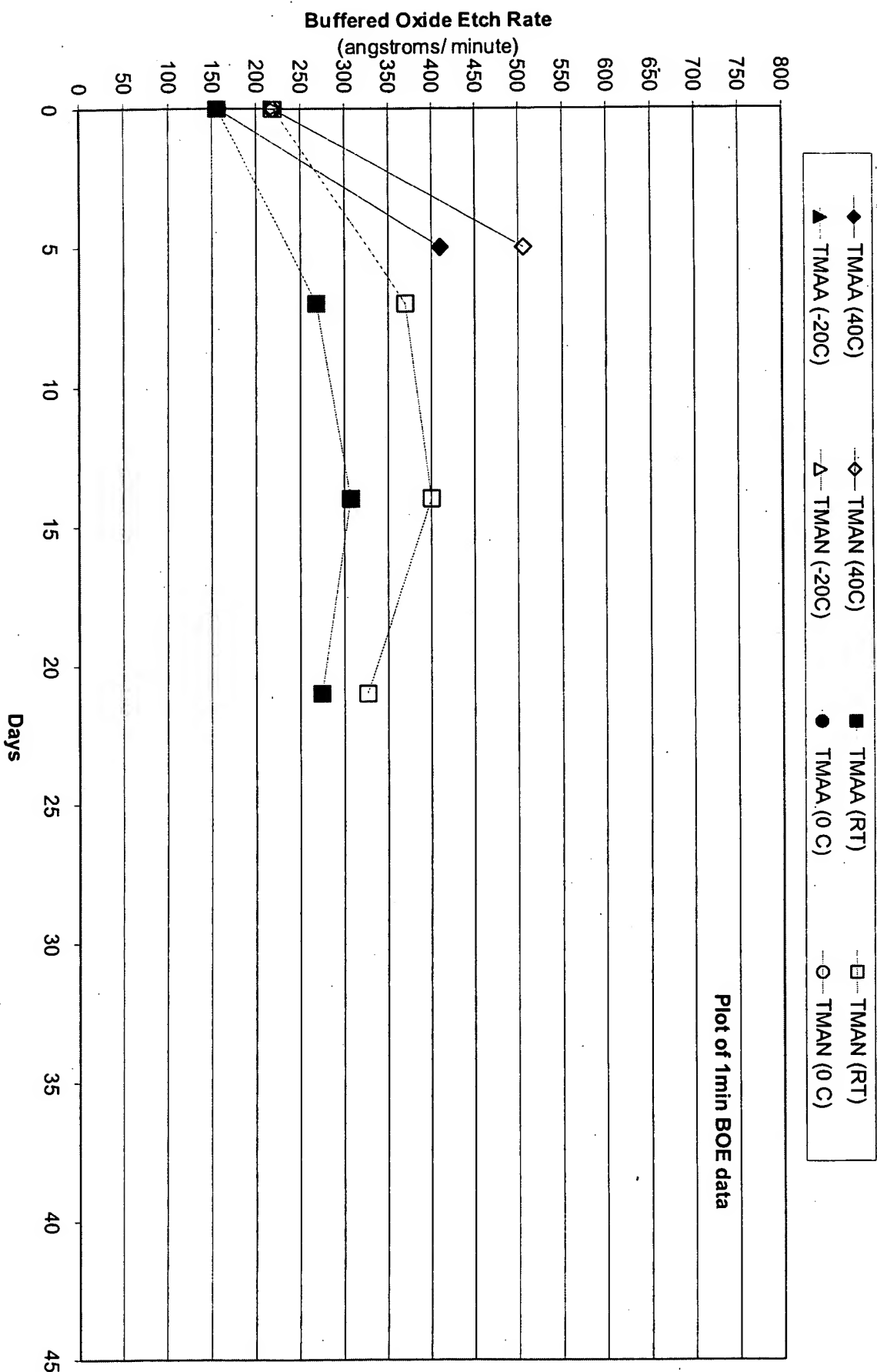


Table 14

193 Absorbing Composition 248 Abs. Comp.

Descriptions		+ 600ppm TMAN	+ 600ppm Stabilized TMAA	
pH		1.7	0.5	N/A
Bake temp. (C)/Time (Sec)		130/240C -- 90sec	130/240C -- 90sec	130/200C -- 50sec
DIWater Contact Angle		78.7	78.9	74.9
Metrics		ER (A/m In)	ER (A/m In)	ER (A/m In)
2.5% TMAH @ 21°C	1 m in	-7	-9	45
	2 m in	-8	-10	47
	30 sec	263	277	785
500:1BOE @ 21°C	1 m in	506	410	937
	2 m in	413	366	720
DIWater Contact Angle		77.5	78	74.2
Metrics		ER (A/m In)	ER (A/m In)	ER (A/m In)
2.5% TMAH @ 21°C	1 m in	-10	-13	12
	2 m in	-8	-1	30
	30 sec	230	174	715
500:1BOE @ 21°C	1 m in	370	268	796
	2 m in	370	230	670
DIWater Contact Angle		79.2	77.2	72
Metrics		ER (A/m In)	ER (A/m In)	ER (A/m In)
2.5% TMAH @ 21°C	1 m in	-10	-11	24
	2 m in	-9	-7	40
	30 sec	223	215	931
500:1BOE @ 21°C	1 m in	400	307	964
	2 m in	405	313	[720]
DIWater Contact Angle		77.5	78.3	70
Metrics		ER (A/m In)	ER (A/m In)	ER (A/m In)
2.5% TMAH @ 21°C	1 m in	-4	1	96
	2 m in	-6	1	96
	30 sec	266	256	935
500:1BOE @ 21°C	1 m in	326	274	912
	2 m in	[351]	[319]	[722]

Table 15

248 Abs. Comp 193 Absorbing composition

Descriptions			+ 600ppm TMAH
Bake temp. (C)	130/200C		130/240C
DI Water Contact Angle			
Metrics	ER (A/m In)	ER (A/m In)	ER (A/m In)
2.5% TMAH @ 21°C	1 min	67	-3
	2 min	62	-2
	30 sec	815	158
500:1BOE @ 21°C	1 min	688	171
	2 min	621	173
	30 sec	2833	
NE-14 @ 21°C	1 min	> 2815	
DI Water Contact Angle			
Metrics	ER (A/m In)	ER (A/m In)	ER (A/m In)
2.5% TMAH @ 21°C	1 min	31	-2
	2 min	49	-2
	30 sec	753	154
500:1BOE @ 21°C	1 min	735	181
	2 min	[605]	188
	30 sec	2636	
NE-14 @ 21°C	1 min	> 2710	
DI Water Contact Angle			
Metrics	ER (A/m In)	ER (A/m In)	ER (A/m In)
2.5% TMAH @ 21°C	1 min	74	-8
	2 min	80	2
	30 sec	839	165
500:1BOE @ 21°C	1 min	742	188
	2 min	655	188
	30 sec	3040	
NE-14 @ 21°C	1 min	> 2792	

Table 16

248 Absorb. Comp. 193 Absorb. Composition

Descriptions			+ 600ppm Stabilized TMAA	+ 600ppm TMAA
Bake temp. (C)		130/200C	130/240C	130/240C
DIWater Contact Angle				
Metrics		ER (A/min)	ER (A/min)	ER (A/min)
2.5% TMAH @ 21°C	1 min	53	-2	-1
	2 min	56	1	-6
500:1BOE @ 21°C	30 sec	700	173	184
	1 min	688	156	253
	2 min	601	168	286
NE-14 @ 21°C	30 sec	1732		
	1 min	> 2825		

Table 17

248

AC

193 Absorbing Composition

Description		248.2100.200m m	Rev A	+ 1070ppm "optimized" APTEOS Triflate						
pH		N/A	1.5	<2						
Bake Sequence		130/200 C	130/200°C	130/180 C	130/200°C	130/220C	130/240°C	130/250C	130/280C	
		50 sec	90 sec	90 sec						
500:1 BOE	1 min @	ER	ER	ER	ER	ER	ER	ER	ER	
	20 °C	743	[1568]	[1403]	[1354]	1311	[1111]	912	884	[850]
	23 °C	76	57	32	72	31	36	2	2	27
	50 °C	780	100	144	105	90	45	16	16	8
	75 °C	1931	781	797	622	446	372	228	179	129
5.0% aq. TMAH	23 °C		46	37	81	1	21	16	20	0
	50 °C	>3522	298	347	256	222	123	47	38	46
	75 °C	>3566	1212	1261	789	782	624	406	321	211
10.0% aq. TMAH	23 °C	>3511	166	196	93	60	52	12	26	14
	50 °C	>3536	716	766	704	485	294	205	115	41
	75 °C	>3571	>2706	[1981]	[1493]	1282	900	745	462	332

Table 18

248 AC



193 Absorbing Composition

Description		248.2100.200mm				Rev A + 1070ppm "optimized" APTEOS Triflate + 1.5% DPG			
pH		N/A				<2			
Bake		130/200 C				130/180 C			
Sequence		50 sec				90 sec			
500:1 BOE	1 min @ 20 °C	ER	[1603]	ER	[1439]	ER	[1282]	ER	[1219]
TMAH	1 min @ 23 °C	78	74	74	74	74	113	42	19
2.5% aq.	50 °C	393	386	146	146	123	123	10	23
TMAH	75 °C	1988	2567	1483	1483	1090	590	538	
5.0% aq.	23 °C	818	110	54	54	27	73	42	
TMAH	50 °C	> 3509	959	400	400	275	98	65	
	75 °C	> 3484	> 2862	> 2867	> 2867	1366	900	856	
10.0% aq.	23 °C	> 3486	503	105	105	75	31	23	
TMAH	50 °C	> 3509	959	400	400	275	98	65	
	75 °C	> 3474	> 2804	> 2819	> 2819	> 2821	1616	1283	

Table 19

248
AC

193 Absorbing Composition

Description		248.2100.200m m	Rev A	+ 1070ppm "optimized" APTEOS MSA + 1.5% DPG						
pH		N/A	1.5	<2	<2	<2	<2	<2	<2	<2
Bake Sequence		130/200 C	130/200°C	130/180 C	130/200°C	130/220C	130/240°C	130/250C	130/280C	
1 min @		50 sec	90 sec	90 sec	90 sec	90 sec	90 sec	90 sec	90 sec	
500:1 BOE		ER	ER	ER	ER	ER	ER	ER	ER	ER
20 °C		743	[1568]	[1385]	1086	852	801	800	755	
1 min @										
23 °C		76	57	34	26	12	5	24	4	
50 °C		780	100	131	43	36	49	20	7	
75 °C		1931	781	1129	507	518	201	242	226	
5.0% aq. TMAH										
23 °C			33	46	23	4	24	13	17	
50 °C		>3522	298	444	115	73	15	23	10	
75 °C		>3566	1212	>2389	695	686	372	466	383	
10.0% aq. TMAH										
23 °C		>3511	166	94	26	32	6	6	12	
50 °C		>3536	716	906	337	168	33	82	49	
75 °C		>3571	>2706	>2331	[1515]	172	746	970	513	

Table 20

193 Absorb. Comp.

Materials	pH	Days at 40C	Mn	Mw	Mp	Mz	M _{n+1}	PDI
Rev A + 1070 ppm "opt" apteos triflate	1.732	0	780	1109	735	1488	1844	1.422
		5	1062	1568	1329	2188	2853	1.476
Rev A + 1070 ppm "opt" apteos triflate + 1.5% DPG	<2	0	891	1269	754	1722	2179	1.424
		7	1058	1486	1198	1995	2520	1.404
Rev A + 1070 ppm apteos msa + 1.5% DPG	<2	0	880	1241	749	1680	2127	1.41
		7	1006	1410	1175	1887	2364	1.402

5 days at 40C 193AC	Mn	Mw	110 nm via fill
pH 1.5 + 2000 ppm nitric acid acidified TMAA	1289	1641	No voiding

Table 21

248
AC 193 Absorbing Composition (AC)

Description	248.2100.200 mm	Rev A	pH 5.5	Rev A + 1070ppm APTEOS Nitrate	Rev A + 1070ppm APTEOS Nitrate + 1.5% DPG	Rev A + 1070ppm APTEOS Nitrate + 3% DPG	Rev A + 1070ppm APTEOS Nitrate + 6% DPG	Rev A + 1070ppm APTEOS Nitrate + 9% DPG
pH	N/A	1.5	5.5	<2	<2	<2	<2	<2
Bake	130/200 C	130/200°C	130/240 C	130/240 C				
Sequence	50 sec N2	90 sec N2	60 sec N2	90 sec N2				
500:1 BOE	ER		ER	ER	ER	ER	ER	ER
TMAH	675	[1568]	612	422	[545]	571	681	626
2.5% aq.	62	Pre	41	28	1	10	56	32
TMAH	525	2694	41	42	0	28	20	26
	3018	2663	142	117	356	224	347	463
5.0% aq.	485	2679	142	40	5	32	57	10
TMAH	3536	2723	9	20	18	17	21	13
	3527	2699	339	119	508	259	524	776
10.0% aq.	3461	2687	17	30	2	20	36	14
TMAH	3469	2670	142	41	81	106	50	30
	3514	2706	859	219	1040	546	1075	1573

Figure 26

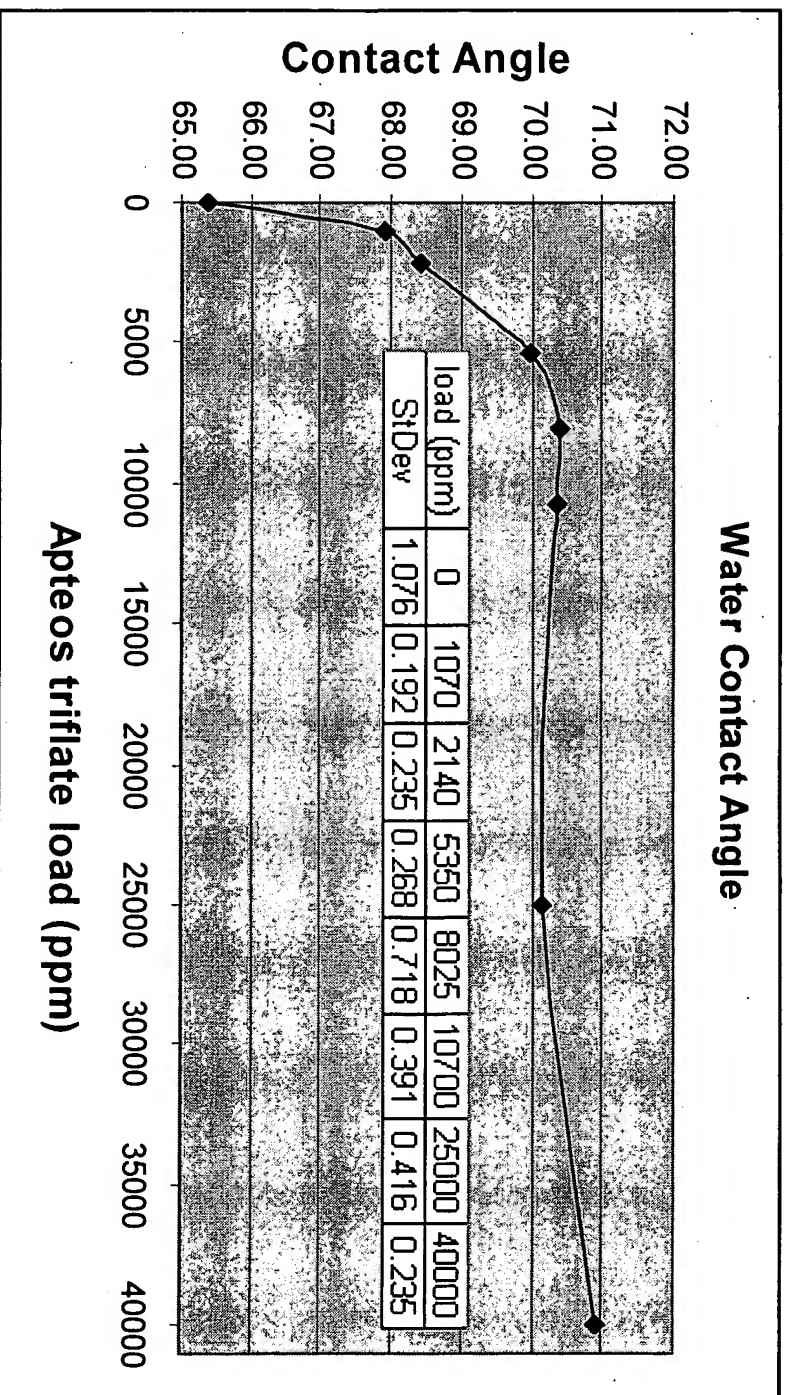


Table 12

193 Absorbing Comp.

Description	Thickness	1 dev	Reflectance @ 193nm	n @ 193nm	k @ 193nm
193 Rev A	1469	12.2	9.77	1.8027	0.3811
193 Rev A + 1070 ppm APTEOS Triflate	1502	15.4	10.26	1.8019	0.3469
193 Rev A + 2140 ppm APTEOS Triflate	1514	12.1	10.33	1.7945	0.3304
193 Rev A + 5350 ppm APTEOS Triflate	1509	15.4	10.18	1.7931	0.3362
193 Rev A + 8025 ppm APTEOS Triflate	1512	9.7	10.19	1.7918	0.3329
193 Rev A + 10700 ppm APTEOS Triflate	1506	12.7	10.15	1.7958	0.3427
193 Rev A + 25000 ppm APTEOS Triflate	1500	12.2	10.14	1.7998	0.3526
193 Rev A + 40000 ppm APTEOS Triflate	1533	10.5	10.16	1.7793	0.3276

Table 23

ppm APTEOS Triflate	40C Aging	Mn	Mw	Mp	Mz	Mz+1	Polydispersity
193 + 1070 ppm APTEOS Triflate	0	920	1283	759	1724	2173	1.395362
	5	1279	1681	1405	2174	2706	1.314284
193 + 2140 ppm APTEOS Triflate	0	754	1119	744	1562	2000	1.483957
	5	955	1378	788	1897	2455	1.442483
193 + 5350 ppm APTEOS Triflate	0	876	1226	754	1640	2046	1.39940
	5	984	1367	779	1819	2268	1.38917
193 + 8025 ppm APTEOS Triflate	0	877	1228	754	1646	2058	1.40051
	5	988	1369	1112	1812	2247	1.38518
193 + 10700 ppm APTEOS Triflate	0	875	1226	755	1642	2052	1.40143
	5	1001	1396	1156	1860	2320	1.39492
193 + 25000 ppm APTEOS Triflate	0	846	1204	764	1635	2060	1.42421
	5						
193 + 40000 ppm APTEOS Triflate	0	835	1169	755	1558	1930	1.39928
	5	846	1260	773	1726	2168	1.489298

193 Absorb. Comp.

Table 24

Description		248 AC	193 Absorbing Composition	Rev A	Rev A + 10,700 ppm APTEOS Triflate (10X)	Rev A + 40,000 ppm APTEOS Triflate (37X)
pH		N/A			< 2.5	< 2.5
Bake		130/200 C				130/240 C
Sequence		50 sec N2		90 sec N2		90 sec N2
500:1		1 min @		ER	ER	ER
BOE		20 °C		751	776	[1116]
TMAH		1 min @				
2.5% aq.		23 °C		35	67	22
50 °C				493	100	-8
TMAH		75 °C		1488	781	334
5.0% aq.		23 °C		287	43	-25
50 °C				[1604]	298	69
TMAH		75 °C		[2639]	1212	309
10.0% aq.		23 °C		3491	166	-8
50 °C				3427	716	162
TMAH		75 °C		3443	2706	1440
						2912

Figure 27

